TRANSIT-SUPPORTIVE LAND USE PLANNING GUIDELINES

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INTRODUCTION

CHAPTER 1

This document contains a set of guidelines which show how all forms of urban development and redevelopment can be made more accessible by public transit. The guidelines are a distillation of transit-friendly land use planning and urban design practices, drawing from experience in Ontario and from elsewhere in North America and abroad. To make them as effective and practical as possible, the guidelines were reviewed and refined with input from a variety of groups interested in the transit-land use connection: professional urban planners, transit organizations, municipalities, environmentalists, developers and the building industry.

Highlights of the concepts behind the guidelines are discussed and illustrated briefly in this introduction to provide a context for the more detailed guidelines which follow. The purpose and rationale behind these guidelines are also documented here, along with a description of the structure of the document and how to use it. A glossary of commonly used terms is included at the end of the guidelines.

Purpose

The purpose of these guidelines is to provide ideas and guidance to land use planners, transportation planners, municipal politicians, developers, transportation engineers, transit operators and others, on planning and development practices which support the provision and use of public transit. These include development patterns which make transit less expensive, less circuitous, more efficient and more convenient, as well as those which make access to the system more attractive to the potential transit user. These guidelines are applicable both to new development, as well as to redevelopment of existing urban areas. The best approach is to design a new area to be transit-supportive form the outset, since it is expensive and difficult to transform an auto-oriented urban area into a transit-supportive urban area once buildings and roads have been constructed.

The guidelines included here represent suggestions and advice to be used at the discretion of municipalities, and are not formal statements of provincial policy.

The guidelines summarize the best available knowledge about moving toward more transit-oriented communities. However, before proceeding to the guidelines, a basic question must be addressed: why should a municipality wish to move in this direction?

Why Support Transit?

The simple answer is that transit is a more effective and efficient way of moving people within cities and towns than the private automobile, when all costs are considered. From this simple fact spring a variety of related factors.

Transit is more space-efficient than the automobile. Less land is required to move a small number of transit vehicles than to move a large number of automobiles carrying the same number of people. Land not used for transportation is freed-up for other active uses or for public open space.

Transit is more energy-efficient than the automobile. Less energy is needed to move a person by transit than by automobile, under normal loading conditions.

Transit is "cleaner" than the automobile. This is directly related to transit's superior energy-efficiency. Since less energy is used to move people, smaller amounts of air pollutants and greenhouse gases are produced by transit per person-km of travel.

From an environmental standpoint, projected increases in automobile use around the world will cause motor vehicle emissions to skyrocket over the next 40 to 50 years, with potentially significant impacts on global weather patterns and air quality. To deal with

these problems, a significant decrease in emissions of CO_2, carbon monoxide, hydrocarbons, and nitrogen oxides is required. Discharges of these chemicals can be reduced by designing more fuel-efficient vehicles. However, less fuel consumption is the real key to lowering emissions. Efficient and convenient urban and inter-urban transit can play a significant role in reducing fuel consumption, by providing a viable alternative to the use of the private automobile.

In many instances, transit facilities are more cost-effective to provide and use than automobile facilities. Since transit is more frugal with resources such as land and energy, it is often cheaper to meet a mobility need with transit rather than through road widenings or extensions. Since good transit planning requires higher density, more compact development, planning for transit can also provide a significant cost saving for other municipal services such as sewer and water mains, or municipal roads and utilities, as it reduces the need for additional serviced land as cities develop. Other benefits resulting from increased development densities include protection of land devoted to agricultural and other uses, protection of environmentally sensitive areas, and increased opportunities for cycling and walking.

Transit provides mobility to all persons in society. People who can't drive, can't afford a car, or simply wish to lead a more environmentally friendly lifestyle can use transit if it is available and convenient.

Transit usage benefits from, and encourages greater pedestrian activities and a more efficient use of land. Thus a transit oriented city promotes mixed use, greater public presence on the sidewalks, a renewal of downtown activities, and greater informal surveillance and safety.

In short, transit in many ways is an excellent tool to help achieve sustainable development and an improved urban environment. In many cases, the quality of the environment, the quality of life, and the economic competitiveness and vitality of transit-oriented urban areas are all higher than those of automobile-oriented urban areas.

Why Does Transit Need Support?

All these factors seem to imply that transit should be a major, (and perhaps dominant), mode of transport in Ontario's cities and towns. Yet today this is true only in Ontario's largest cities. In most of Ontario's urban areas, transit is a marginal social service, providing mobility to those without access to automobiles in an automobile-oriented environment.

The reason behind this apparent contradiction is equally simple: transit can only be seen as a superior mode when all costs and benefits are factored in; as a society, we have been slow to factor in all the costs. Some we undervalue, and others we simply ignore.

Per capita, transit is more space-efficient and energy-efficient than the automobile; but compared to many other places in the world, energy in Ontario has been cheap. The automobile is more flexible and convenient; while we recognize we are paying a higher price in terms of land and energy, until now we have been more than willing to pay that price to enjoy the automobile's benefits.

In our largest cities, where traffic congestion has increased the demand for new transportation facilities, neighbourhood disruption, environmental concerns, costs and related political difficulties have effectively ruled out major road expansion in built up

areas. Large cities have come to view transit as the basic mode to serve expansion in central areas and an important alternative way to provide mobility in suburban areas.

Transit in Smaller Urban Centres

Our largest cities have recognized transit as a positive and necessary urban force. But how realistic is it for smaller municipalities to encourage transit-oriented land use patterns when the trend has overwhelmingly been toward automobile-oriented development?

There are at least six responses to this. First, some of the guidelines in this document can be implemented with little, if any, cost, effort or difficulty. Particularly in the area of urban design, simply giving some consideration to the needs of transit vehicles and transit users, where none was given before, can result in transit improvements, and transit-related benefits, at little cost to anyone or anything.

Second, since transit cannot usually provide universal door-to-door access, transit users are pedestrians at both ends of the trip. Therefore, transit-friendly urban planning and design is also by nature pedestrian-friendly. Many of the pedestrian-oriented guidelines in the document can result in an improved, safer and more attractive urban environment, quite apart from their transit benefits. By encouraging more mixed-use development travelling distances can be reduced, which will encourage walking and cycling.

Third, municipalities may wish to prepare for the possibility of increasing traffic congestion if their communities continue to grow, and begin preparing for the day when transit must shoulder a significantly larger share of the transportation burden, realizing that early provision will make the transition easier.

Fourth, by considering the recommendations contained in these guidelines, smaller municipalities could avoid many of the mistakes associated with auto-oriented development in larger urban areas.

Fifth, high land and infrastructure costs have prompted larger urban areas to place greater reliance on their transit systems. However, land prices and infrastructure costs have also risen substantially in smaller municipalities over the past few years, prompting a closer look at how efficiently land and infrastructure are utilized in these urban areas as well.

The sixth, and perhaps the most compelling response, is that the value system which gives low priority to transit is itself changing. General awareness of environmental issues has grown dramatically in recent years, and shows signs of continuing strength. Ontario is beginning to change from a consumer to a conserver society, and people are beginning to assess the environmental consequences of their everyday actions. When environmental considerations are introduced, the scales begin to weigh heavily toward transit; the value of transit increases as the value placed on environmental concerns increases.

In Ontario's largest cities, it was congestion and the political/financial costs of road expansion which provided the spur to transit. In Ontario's small urban areas, where congestion may never be a major problem, it may be environmental, social, and financial/economic concerns which provide the same spur. If the predictions of many environmentalists are correct, the question may shift from **whether** municipalities should

promote transit-oriented development, to **how**. These guidelines provide some of the answers to that question.

Transit-oriented Versus Automobile-oriented Development: A Comparison

The move toward transit-supportive urban design requires a comprehensive examination of current, automobile oriented urban development patterns. Until the first few decades of the twentieth century, before automobiles became commonplace, urban areas developed as compact, high density concentrations of activity. Typically they were characterized by a mix of uses located within close walking distance of each other. Streets were developed on a grid system, and buildings were usually located close to the street line, particularly along main streets and in downtown cores. Because automobiles were few in number, or non-existent, there was no choice but to design towns and cities in a transit- and pedestrian-supportive fashion.

Urban development patterns changed radically after the Second World War. Typical post-war planned communities are characterized by large, low density, single use areas, which are often located a considerable distance from each other. Widespread automobile ownership has made these land use patterns feasible. However, these patterns have made transit, walking, and cycling less convenient, because everyday activities are often located in dispersed areas which cannot easily be reached by a single transit trip or a short walk.

The hierarchical road networks typical of mid and late twentieth century suburban communities also tend discourage pedestrian and transit travel. In most suburban areas, winding local roads feed into a smaller number of collector roads, which in turn feed into a very limited number of high volume arterial roads. Usually these arterials are the only roads which provide direct, through routes, and they also define the corridors for major

A typical suburban arterial.

transit services. Typically, arterials are designed to satisfy one primary goal: the fast and efficient movement of large volumes of automotive traffic. The consequences for transit use and pedestrians have generally been negative. To accommodate high traffic volumes, arterials are wide, and intersections are frequently designed with special turning lanes, wide turning radii, and other features intended to speed up traffic flow. But these design features also detract from the pedestrian experience by creating noisy streets which are difficult to cross. To smooth traffic flow further, access onto arterials is usually restricted, intersections must be spaced far apart, and street-oriented uses are not permitted. Unfortunately these design features also create a sterile, unpleasant and possibly dangerous environment for pedestrians. The quality and convenience of the pedestrian experience is equally as important as the convenience of transit services since, as noted earlier, transit users become pedestrians at both ends of the transit trip.

Some of the major principles of transit oriented urban design, include:

- **A grid network instead of a discontinuous road network.** Roads laid out on a grid, with close spacing of arterials and collector roads, will provide for direct and regularly spaced transit routes serving all directions. It will also disperse automobile traffic, reduce congestion, and reduce the need for excessively wide arterial roads which are designed solely to move large volumes of automobile traffic. The grid principle still permits the development of local road patterns to moderate through traffic flows in residential neighbourhoods.

- **Street-oriented uses along arterial roads.** As the traffic demands on arterial roads are reduced, developing street-oriented uses along these roads will once again become feasible. The result is a more attractive and safe environment for pedestrians, which encourages walking and transit use. Reverse lotting along arterial roads, and commercial strip development with large parking lots fronting onto the road, should both be avoided.

- **A mix of higher density uses along arterial roads**, including retail, residential, employment, entertainment and institutional uses. Compact, mixed use development along arterials will encourage transit use by reducing travelling distances and encouraging more balanced ridership in both directions along the route and throughout the day. This development pattern might be similar to the commercial "main streets" which developed in both large and small urban areas before the automobile became commonplace.

- **Improved access between arterials and the interior of blocks**. New subdivisions tend to be inward looking with a limited number of entry roads from surrounding arterials. Although this discourages through-traffic from using residential streets, it also makes it difficult for buses to provide convenient service and for pedestrians to walk from the interior of a block to bus stops located along arterial and collector roads. Access can be improved by providing mid block pedestrian walkways. However, a better solution from safety, convenience and efficiency standpoints is to design subdivisions so that a larger number of local roads intersect directly with the arterial network. More frequent intersections along arterial roads, coupled with an overall grid system of roads, will allow buses to provide better coverage and more direct service, and provide more direct pedestrian access to the transit service.

These and other major principles are discussed in greater detail within the following chapters.

Higher densities and street-oriented uses encourage transit use.

How to Use This Document

The guidelines are divided into three chapters corresponding to the following major subject areas:

- **Land Use,** which deals with how various land use practices, patterns and policies affect the provision and use of transit service;
- **Physical Design,** which focuses on how the design of roads, pedestrian facilities, buildings and other elements of the built environment affects transit efficiency, convenience and ridership;
- **Process and Incentives,** which concentrates on the many related actions which municipalities and developers can undertake to increase transit ridership and improve the transit-land use relationship.

Within each chapter, guidelines are further divided into specific topics (e.g. phasing of development, layout of local roads or parking policy). Some recurring themes include:

- **Land Use Planning**, i.e. urban structure, density and mix of uses, location and timing;
- **Pedestrian Access,** i.e. effort and comfort, safety, maintenance, and aesthetics for all pedestrians including those who use mobility aids (wheelchairs, scooters, etc.) persons with strollers and buggies, and frail elderly persons. In these guidelines, the term pedestrian is intended to include all of the groups listed above.
- **Transit Vehicle Access,** i.e. road layout, road design and transit priority measures;

- **Mode Shift Incentives,** i.e. parking and transit pricing policies, parking supply policies;
- **Planning Process,** i.e. process-related improvements which can aid the shift to more transit-oriented development.

Of particular interest to urban planners, guidelines in Section 4.3 set out specific transit-supportive considerations which apply at different stages of the planning process: Official and Secondary Plan preparation, zoning by-law development, and review of site plans and plans of subdivision.

Each individual guideline is further "tagged" with two identifiers which describe the specific situation(s) to which it applies. These are:

- **Planning scale**, i.e. regional/county-wide, municipal urban form/structure, community/neighbourhood, site planning and design; and
- **Size of community**, i.e. Large, Medium or Small.

Each guideline is presented in a common format. The discussion of each guideline contains:

- A short, clear **statement** of the guideline;
- A discussion of **background** which briefly describes the features of the guideline, the problems it addresses and the principles it follows;
- A few suggestions on taking **action**, which give insight into the common constraints, problems and issues encountered in applying the guideline, as well as ways of overcoming the difficulties;

The background section is included because the guidelines are not intended to be simple "cookbook" measures. The guidelines presented are not the only ways of meeting the objective of transit-oriented development. It is expected that municipalities will adapt these guidelines to their own individual situations and develop solutions and approaches beyond those contained in this document.

Some of the guidelines contain recommendations which are written in terms of actions which municipalities "should" take, rather than "may" or "might consider" taking. This wording is intentional, since it was felt that these particular recommendations were essential to developing a more transit-supportive land use structure.

Appendix A is a "map" to the guidelines, showing how they are distributed in terms of topic and the urban planning scale(s) at which each guideline tends to be most applicable.

Applicability of Guidelines

The concepts discussed in the majority of these guidelines apply equally to large, medium and small municipalities. In some cases, such as recommendations for higher density development, or development of a network of activity nodes and subcentres, the guidelines will apply in different ways to large, medium and small communities. Where this is the case, these varying interpretations have been addressed within the guidelines themselves.

Several guidelines will apply primarily to larger urban areas or at a regional scale. These include:

- Urban Separators and Inter-Urban Transit Systems (Guideline 2.2.2);
- Transfer Nodes (Guideline 3.6.2);
- High Occupancy Vehicle Lanes (Guideline 4.4.1)
- Traffic Pre-emption Systems (Guideline 4.4.2);
- Queue Jump Lanes (Guideline 4.4.3); and
- Transit Malls (Guideline 4.4.5).

Planners in **smaller urban areas** may wish to pay particular attention to the following guidelines:

- Location of new shopping centres (Guideline 2.4.1);
- Location of uses such as schools, seniors' residences and hospitals, which require and help support transit services (Guideline 2.4.2);
- Arterial and collector road design (Guidelines 3.3.1 and 3.3.2);
- Access for buses serving suburban shopping or employment centres (Guideline 3.6.1).

It should be noted that the guidelines listed above also apply equally well to large urban areas. In addition, planners, transit operators, and developers working in smaller urban areas should review all of the guidelines contained in the document, since many of the underlying principles apply both to large and small urban areas, and also because small urban areas may eventually evolve into larger centres.

Some of the recommendations contained in this report can be implemented only over the **long term**, and may require changes in current approaches to land use and transportation planning. Redevelopment in some post-war urban and suburban areas, to create a more transit- and pedestrian-friendly environment is a case in point. However, many of the guidelines can be implemented in the **short term** at limited cost, particularly in areas undergoing greenfield development, or in older sections of urban areas which were developed prior to the advent of the automobile. Examples of such shorter-term guidelines include:

- Encouraging intensification at existing activity nodes, and adjacent to major suburban shopping malls. (Guidelines 2.3.1 and 3.6.1)
- Encouraging higher density, mixed use development along transit routes; (Guideline 2.3.2)
- Avoiding reverse lotting in new subdivisions; (Guidelines 3.3.4 and 3.5.1)
- Developing a more transit and pedestrian friendly streetscape design along arterials; (Guidelines 3.3.4 and 3.5.2)
- Designing subdivisions to minimize walking distances to transit stops; (Guideline 3.4.1)
- Development of street-oriented uses along arterial roads; (Guidelines 3.5.1 and 3.5.2)

Several guidelines address the **evolution** of urban areas, built form, transit systems and transfer nodes, and the importance of harnessing these trends to help develop a more transit-supportive urban form and environment. Planning, transportation and engineering staff and transit operators should work with applicants to develop proposals which can evolve into a more transit-supportive form as the urban area grows. Specific guidelines which address this topic include:

- Evolution of transit systems; (Guideline 2.3.3)
- Design of transit-supportive urban form; (Guideline 3.2.1)
- Design of pedestrian-supportive arterials and streetscapes; (Guidelines 3.2.2, 3.3.4, 3.5.1 and 3.5.2)
- Intensification adjacent to shopping centres; (Guideline 3.6.1)
- Intensification at transfer nodes. (Guideline 3.6.2)

A common theme in these guidelines is the importance of thinking ahead when planning and laying out new or redeveloped subdivisions, street systems, transit services, streetscapes, shopping malls, transfer nodes and related activity centres. Since many smaller urban centres tend to grow larger in their own right and/or to merge into larger conurbations over time, these guidelines are generally applicable to urban areas of all sizes.

Finally, it will be noted that there is a degree of duplication among the guidelines in that certain concepts (eg. achieving compact, mixed-use urban form with defined nodes and corridors of higher intensity uses, a continuous network of arterial and collector roads designed to accommodate and encourage transit and pedestrians as well as automobile traffic, etc.) appear in more than one guideline but in different contexts and at various scales. This reflects the strong interaction among such concepts and the intent that each guideline be relatively complete and self-evident without the need for extensive cross-referencing by the reader. Cross-references are also given in some cases, however, to make it easier for the interested reader to explore such interactions.

LAND USE PLANNING

CHAPTER 2

URBAN STRUCTURE AND THE DENSITY AND MIX OF USES

Urban structure is the foundation for a transit-supportive environment. Urban areas must be compact to permit cost-effective and convenient transit services. Scattered development in suburban areas should be avoided since it cannot be serviced by transit at a reasonable cost. Designating strict urban boundaries can encourage more compact urban areas, and can discourage scattered development.

Density is also an important factor. Although higher residential and employment densities will not necessarily result in higher levels of transit use, they are a necessary prerequisite. As development densities increase, the number of potential passengers per route kilometre increases, helping to generate more ridership and higher revenues. With increasing revenues, transit operators can provide more frequent service at current subsidy levels. Frequency of transit service, in turn, has a direct impact on transit ridership and can encourage even higher levels of transit use.

Individual routes should provide direct access to a wide range of activities and uses, in order to maximize the convenience for transit users. If transit users have access to most of their daily activities along a single route, then there will be fewer occasions when they have to transfer between routes, potentially reducing trip durations. Mixed-uses along transit routes can also make transit more convenient by promoting a balance between the numbers of riders entering and leaving transit vehicles at each stop. Under these circumstances, transit vehicles will be less likely to be underused or overcrowded at various points along the route and will tend to carry equal volumes in both directions. Mixed uses may also translate into higher revenues to transit operators. A greater number of short trips can result in more fares per kilometre; and more balanced ridership, in both directions, can result in more efficient use of transit vehicles.

More intensive, mixed-use urban areas can also provide additional benefits to urban residents. If residential, retail, commercial and industrial uses are located closer to each other, people will be encouraged to walk more often, and there will be fewer areas which are deserted during long periods of the day. As pedestrian traffic increases along main streets, safety will become less of a concern, particularly in larger urban areas.

If there is a better mix and balance between residential and employment uses in urban areas, a larger proportion of residents will have the opportunity of living within a short distance of their jobs, if they choose to do so. Residents will be more likely to use transit to commute to and from work if distances are relatively short, and their homes and workplaces are linked together by a direct transit route.

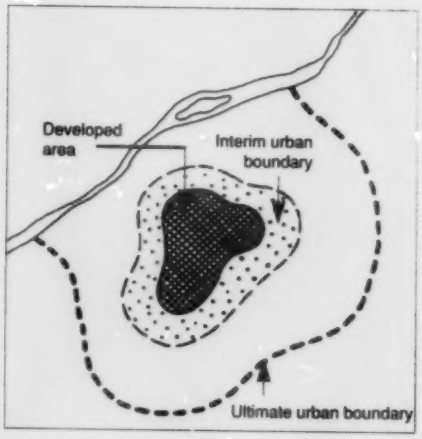
The following guidelines suggest that "mixed-use activity nodes", located at major transit intersection points, as well as "mixed-use activity corridors", to be developed along major transit routes, are both important in achieving a more transit-supportive urban environment. Other issues addressed in the Land Use chapter include criteria for the location of specialized uses such as shopping centres, office development, and human service uses adjacent to transit stops; and the phasing of new development and urban growth areas, in a manner which will permit cost-effective expansion of transit services.

Guideline: 2.2.1

DEVELOP ULTIMATE AND INTERIM BOUNDARIES FOR URBAN AREAS

Background:

To encourage a compact, transit-supportive urban development pattern, municipalities may define two sets of urban boundaries for urban areas: an ultimate urban boundary designed to accommodate urban growth over a long-range planning period; and an interim urban boundary designed to phase urban growth in a logical, compact fashion over the short-term.



Designate Ultimate and Interim Urban Boundaries

Designating ultimate boundaries for urban areas, at the regional or county level and/or the local municipal level, will define the areas that are intended for eventual urban development and the areas that are to remain in agricultural or other non-urban uses over the long term. This will encourage a transit-supportive urban structure by:

- Reducing scattered residential or commercial development in isolated rural areas, which cannot be served by transit at a reasonable cost.
- Reducing speculation and rising land prices in rural areas which can also encourage scattered development.
- Providing a long-range context for phasing growth in a compact fashion within the urban boundaries.

Designating interim urban boundaries within the long term urban area can help to promote efficient and cost-effective urban transit systems by:

- Encouraging urban intensification and compact urban form (Guideline 2.2.3).
- Encouraging higher residential and non-residential densities in urban areas, which will support higher levels of transit service (Guideline 2.2.3).
- Discouraging dispersed suburban development outside of the designated interim boundary which would add significantly to the cost of providing transit services.

Action:

- Designate an ultimate urban boundary in regional and local official plans. Ideally, the ultimate urban boundary should incorporate man-made physical barriers such as a rail line or freeway and/or natural topographic features such as valley lands or a watershed boundary. Ultimate urban boundaries should be sufficiently large to incorporate the land area required for urban development over a long range planning period.
- Designate all land outside of the ultimate urban boundary as agricultural land, open space, greenbelt or parkland, or some other non-urban land use category.

PLANNING SCALE: Regional/Area Municipal **URBAN SIZE: All**

- Designate the existing urban area, plus sufficient land to accommodate projected urban development over the next 10 years (including infilling), within the interim urban boundary.
- The land required to accommodate this growth should be calculated at development densities which are sufficiently high to support cost effective transit operations. The municipality should consult with transit operators when formulating policies for residential and non-residential development densities, to ensure that they are sufficiently high to support adequate transit ridership and service levels (Guideline 2.2.3).
- The amount of land designated for urban development within the interim urban boundary should be reassessed by the municipality on a regular basis.
- The remainder of the land within the long-term urban boundary should be designated as a future urban area, with interim land uses limited to existing uses, agriculture, open space or other non-urban land use categories.

Trade-offs are involved in phasing and setting limits to urban development. A ready supply of land for development (or redevelopment) is required at all times within the urban area to ensure an efficient land market. Designating overly restrictive urban boundaries, which contain insufficient land area for development or intensification over the planning period, could lead to a supply/demand imbalance and excessive land prices or lack of choice in the market. Designating excessively large urban boundaries will reduce incentives to develop at higher densities. Regular municipal review of land absorption trends and the adequacy of existing urban designations will help to avoid imbalances in the market. If a municipality decides to limit the expansion of urban boundaries as a means of encouraging more transit-supportive development patterns, then it must ensure that appropriate zoning and the basic infrastructure of social and hard services (such as water, sewer, transportation capacity) is in place so that intensification is possible at a rate sufficient to meet market demand.

PLANNING SCALE: Regional **URBAN SIZE: Large**

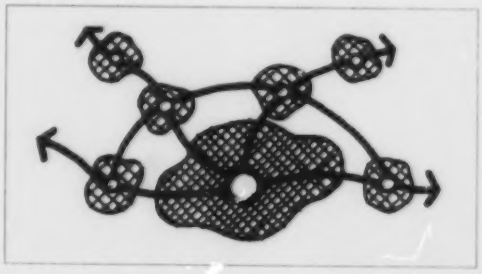
Guideline: 2.2.2

CREATE SELF-CONTAINED URBAN AREAS WHICH ARE LINKED TOGETHER BY A TRANSIT SYSTEM

Background:

Large urbanized regions are often made up of a number of individual urban areas. A regional network of individual urban areas can be transit-supportive if:

- All new urban development is located in a designated urban area. The objective is to strengthen and diversify existing urban centres and to encourage more intensive patterns of urban development, which will support cost-effective transit.
- Each urban centre incorporates a range of residential, commercial, retail, industrial and related employment opportunities which is appropriate for its size, to create relatively self-contained communities, and to reduce the need for inter-urban commuting.

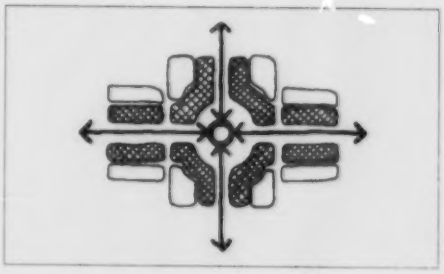


Develop a Regional Transit Network to Link Urban Areas

- Each urban centre incorporates a full range of housing types so that employees have an opportunity to live and work in the same community. The "Land Use Planning for Housing" policy statement outlines provincial requirements for intensification and the range of housing types.
- Each urban centre is served by a local transit system.

Link these urban areas with an inter-urban transit system. Even if individual urban areas incorporate a balanced mix of uses, some residents will still travel to neighbouring urban areas. Linking urban centres with an inter-urban transit system will reduce automobile travel, and help to reinforce the regional network of distinct urban areas, provided that:

- The inter-urban transit system provides fast, direct travel between urban areas. Stations or stops outside of designated urban areas should be minimized to avoid pressures to develop urban or suburban settlements at intervening locations between designated urban areas.



Focus higher density mixed-use development at transit stations.

- Stations or stops are located at the major activity node(s) within urban areas. This will ensure convenient pedestrian access to a wide range of uses and activities at each station/stop. If a wide variety of activities are located at each transit stop, more balanced ridership will be encouraged in both directions along the route (Guidelines 2.2.4 and 3.6.1). Each station/stop should also have good accessibility to a variety of local transit routes (Guideline 3.6.1). If a station/stop cannot be located at an existing node, provisions should be made to facilitate intensification around the station/stop in the future (Guideline 3.6.1).

- In areas where substantial strip development has already occurred along arterial roads or highways located between designated urban areas, intensification should be encouraged, so that the arterial can eventually develop into a transit-oriented mixed-use activity corridor (Guideline 2.3.2).

Auto-oriented Highway Commercial Strip

Example of Intensification Along Highway Strip

Action:

- Designate a network of compact, mixed-use urban centres .
- Develop long-term population and employment targets for each urban centre in regional official plans.
- Link urban areas together with a regional rapid transit system. This system could take several different forms including commuter rail, rail rapid transit, or express bus services.
- Provide local transit service and, depending on the area's size and density, rapid transit service within each urban area. Fare and service integration, and co-ordination with the local transit system should also be provided.

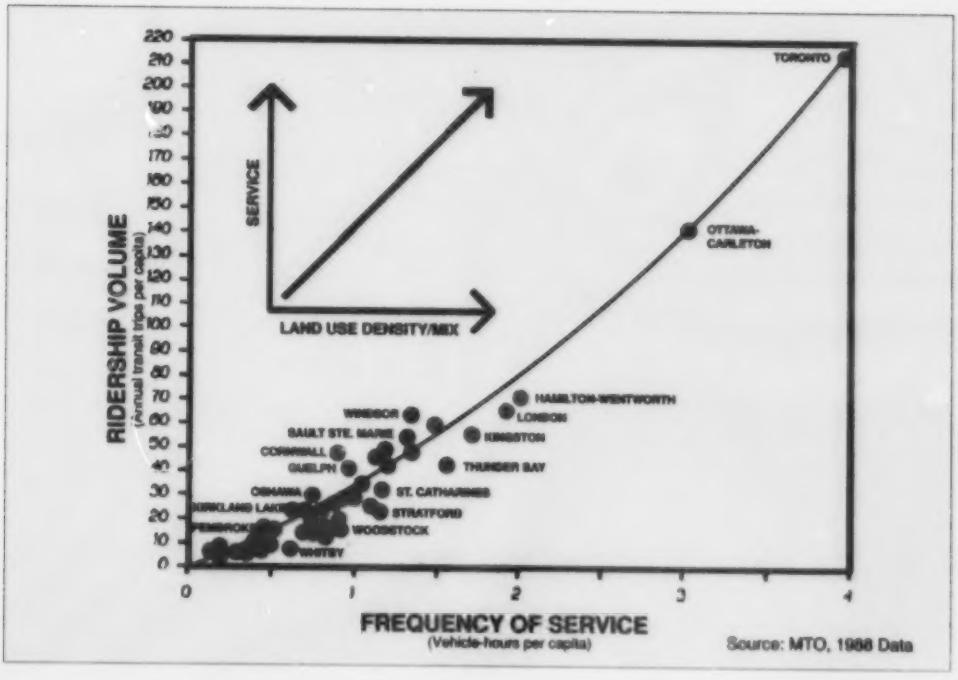
Guideline: 2.2.3

ENCOURAGE HIGHER DENSITY RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT IN URBAN AREAS

Background:

The density of urban development has a direct impact on a number of factors which affect transit use:

- **Frequency and convenience of service:** The level of transit use is strongly related to the frequency of transit service in urban areas, as shown graphically below. Frequency of transit service depends, in turn, on the density and mix of land uses as well as on vehicle loading standards and maximum headway policies adopted by the municipality. As residential and employment densities increase, the number of passengers per route-kilometre increases and a higher level of transit service can be provided in a cost-effective manner. Improved frequency and convenience of service will have positive impacts on transit ridership, thereby further improving revenue/cost ratios and permitting even higher levels of service. Other factors in addition to the density and mix of land uses have an impact on frequency of transit services, including route lengths, costs of providing additional services, and the modal splits between transit and other forms of urban transportation.



- **Distance between transit services and potential users:** Walking distances between trip origins or destinations and transit services are an important consideration for transit users. Higher development densities should be concentrated along arterial roads and other transit routes, and at transit transfer points, to ensure that the maximum number of potential users are located within close walking distance of transit services.

- **Reduced trip length:** Creating a more intensively developed urban area means that more people and activities can be concentrated in the same area. As a result, travelling distances will generally be shorter than in lower density, more dispersed communities. Shorter trips between home, work and shopping will make transit a more attractive option, but trip length will also depend on a number of other factors such as location and mix of uses (Guideline 2.2.4), geographical size of the urban area, and the speed at which transit vehicles can travel along routes.

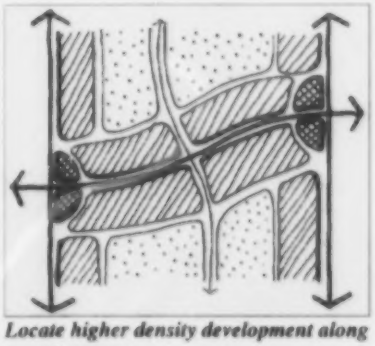
Multi-family residential development can support all types of public transportation service.

Action:

- Consult with transit operators to determine densities for employment and residential land use categories necessary to support transit. These densities should be designated in official plans. A substantial body of research exists regarding the relationships between minimum residential and development densities required to support various types of transit services. The following table illustrates some commonly accepted standards[1]:

Service	Minimum Residential Density Req'd
Bus, 1 km route spacing 1 hr. service	4 units/acre (10 units/hectare) adjacent to route
Bus, 1 km route spacing 1/2 hr. service	7 units/acre (17 units/hectare) adjacent to route
Bus, 1 km route spacing frequent service	15 units/acre (37 units/hectare) adjacent to route
Rapid Transit, 5 min. headways during peak hours	12 units/acre (30 units/hectare) average density over extensive areas with higher densities in central areas and around stations.

- Locate higher density development adjacent to transit routes.
- Locate highest densities adjacent to points where two or more transit routes intersect.
- Locate lower densities away from transit routes.
- Zoning by-laws should permit reduced minimum lot sizes and/or frontages, and/or higher floor space indexes in residential and non-residential areas in order to encourage higher densities.



Locate higher density development along transit routes.

[1] Pushkarv, B.S. & Zupan J.M., 1977: Public Transportation & Land Use Policy

PLANNING SCALE: All **URBAN SIZE: All**

Guideline: 2.2.4

ENCOURAGE A BETTER MIX OF USES IN URBAN AREAS; DISCOURAGE LARGE AREAS ZONED FOR SINGLE USES

Background:

Developing a better mix of uses in urban areas can encourage transit use for the following reasons:

- **Transit is more attractive if a wide variety of uses are located along a transit route:** People will be encouraged to use transit if they live or work near a route which provides direct access to a wide range of uses including employment, shopping, entertainment and residential without having to travel long distances, or waste time waiting at transfer points.

Mixed-use along a transit route encourages transit use.

- On the other hand, if large single use areas are in isolated locations throughout the municipality, transit users will have to travel longer distances, or transfer between a number of different routes (possibly in different directions) to reach a full range of employment, shopping or entertainment activities. Transit will be significantly less attractive than automobiles under these circumstances.
- **Mixed-uses can promote more uniform and balanced levels of ridership along transit routes:** If there is a balanced mix of residential, commercial and employment uses along the length of a transit route, then trips will generally be shorter and more directionally balanced, which will lead to higher and more uniform utilization of transit vehicles and allow more frequent service to be provided. This will be less likely to occur if the route serves a single central core, surrounded by dispersed residential areas.

Under these circumstances, transit vehicles will often be overcrowded at the core and under-used at the periphery, with few passengers on the return trip in peak periods.

- **Mixed-uses encourage day long transit use:** A balanced mix of residential, retail, employment and entertainment uses along a route can generate riders throughout the day and evening and shorten periods of low ridership. Service levels will be more uniform throughout the day, making transit more attractive for off-peak users.

Large single use areas are not transit-supportive.

- **Safer pedestrian environment:** Developing a mix of retail, residential, restaurants and entertainment uses along transit routes will encourage pedestrian activity throughout the day and evening. The presence of people, and informal surveillance from surrounding buildings will discourage potential criminal activities.

Action:

To establish the framework for a more transit-supportive urban structure based on mixed-use development, official plans and zoning by-laws should:

- Permit a wider variety of uses to locate along arterial and collector roads serving as transit routes, and within walking distances of rapid transit stations, or at points where two or more transit routes intersect.
- Avoid single use designations in official plans and zoning by-laws.
- Zone areas adjacent to major transit routes in a "mixed-use" zoning category which will permit higher density residential, commercial, retail, community facility, and employment uses.

PLANNING SCALE: Regional/Area Municipal/District/Neighbourhood **URBAN SIZE:** All

Guideline: 2.3.1

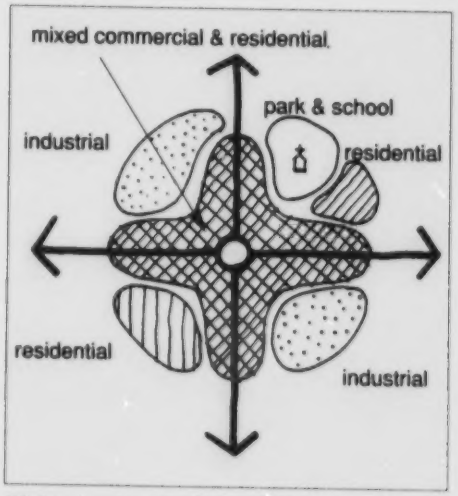
ENCOURAGE HIGHER DENSITY, MIXED-USE DEVELOPMENT TO CONCENTRATE INTO "ACTIVITY NODES"

Background:

A better mix of uses and higher development densities are necessary to encourage greater levels of transit use (Guidelines 2.2.3 and 2.2.4). One way to meet these two requirements is to develop higher density, mixed-use activity nodes in the urban area.

- **Encourage a full range of uses:** Concentrating mixed-uses into clearly defined nodes will serve to concentrate trip ends into a discrete number of locations. This will make it more convenient to use transit, since one transit trip can serve a wide variety of purposes. A variety of employment, retail, recreational, entertainment and cultural uses should be encouraged at these locations. Residential uses should also be included for two reasons: first, some of these residents will commute to other locations for shopping or work, which will help to balance ridership levels in both directions; second, it will ensure that activity nodes are populated on a 24 hour basis, creating a safer environment. For added convenience, day nurseries and other human services should also be located at activity nodes, so that parents can drop off and pick up children and other services can be obtained during their trips to and from work.

- **Encourage higher density residential and employment uses:** Higher density development will place larger numbers of potential users adjacent to well developed transit services, which will add to the likelihood that these individuals will use transit. Higher transit use, in turn, will serve to justify higher levels of service, which will encourage higher levels of ridership. Activity nodes can act as the focal points for the highest density in the municipality. However a variety of densities should be encouraged to permit a mix of incomes and housing types at activity nodes.

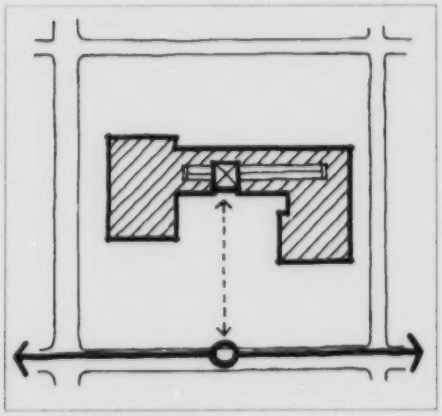


Higher density, mixed-use activity nodes are transit-supportive.

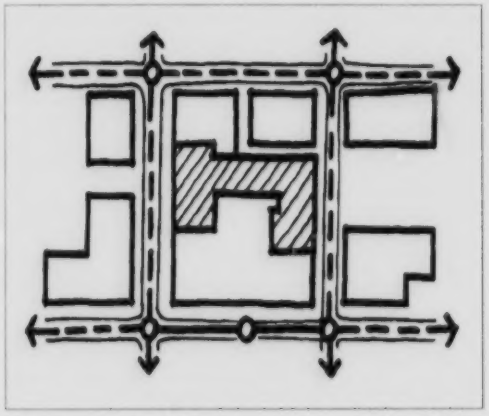
- **Encourage activity nodes to develop at focal points in the transit system:** This will ensure that a wide variety of locations within the urban area have a direct transit link to an activity node. Conversely, when planning new transit routes, intersection points and transit stations should be located within existing or proposed activity nodes.

- **Co-ordinate the size of activity nodes with existing or planned levels of transit service:** The size, density and variety of uses at activity nodes should be directly related to the level and range of transit services provided. Generally, the largest, most densely developed activity nodes should be located at focal points in the transit system. In small urban areas, this will usually occur at the downtown business district.

- **Strengthen existing facilities:** Wherever possible, new activity nodes should build on existing focal points, such as a shopping or employment area, community facility or transit node. Where existing activity nodes have further potential for intensification, new development should be encouraged to locate within an existing node rather than in an isolated location, to take advantage of existing activities and transit infrastructure.



Existing Regional Mall



Encourage intensification around an existing facility

Action:

- Designate one or more activity nodes in official plans.
- Designate activity nodes at points where bus routes intersect, and at commuter rail or rapid transit stations. Locate new transit stations and transit nodes within existing and proposed activity nodes, or at points where intensification could occur in the future.
- Plan the location and size of activity nodes in consultation with transit agencies, to ensure co-ordination of facilities.
- Prepare a pedestrian system plan to maximize pedestrian accessibility throughout the nodal area (Guidelines 3.2.2 and 3.5.1 to 3.5.3 provide information on physical design considerations).
- Vary development densities at activity nodes according to the size of the activity node, the level of transit service offered, and the size of the urban area. Potential development densities include:
  - 1.5 to 2.0 FSI[1] for activity nodes in small municipalities;
  - 2.0 to 4.0 FSI for activity nodes served by buses, in larger municipalities;
  - 3.0 to 5.0 FSI or more for larger activity nodes served by rapid transit and commuter rail, in large urban centres.

[1] Floor Space Index; see Glossary of Terms. Note that these densities are intended as examples only.

Planning Scale: Regional/Area Municipal **Urban Size:** All

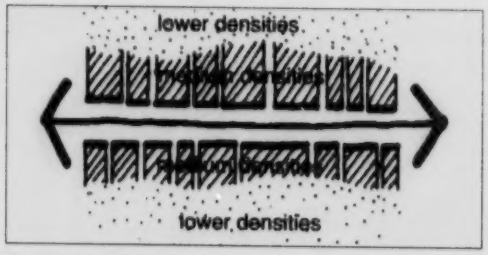
Guideline: 2.3.2

Develop Major Transit Routes as Medium Density, Mixed-Use "Activity Corridors"

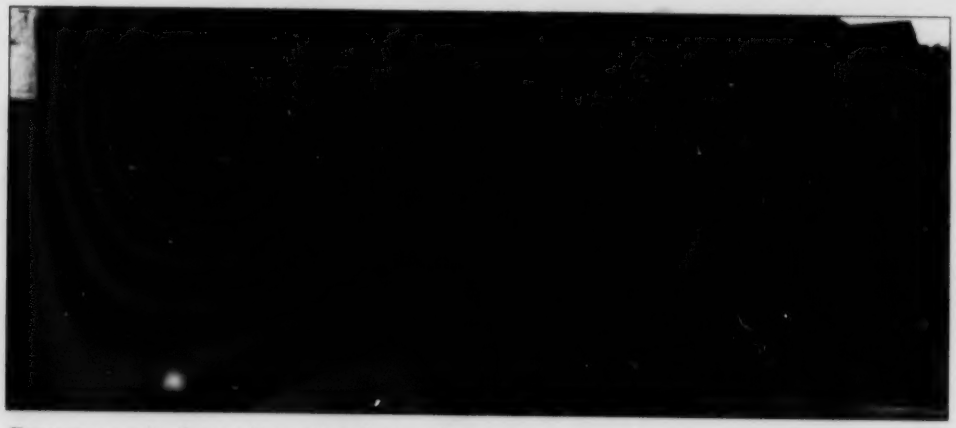
Background:

In conjunction with "activity nodes" higher densities and a better mix of uses can also be encouraged along the full length of major transit routes, in order to develop a more transit-supportive urban environment.

- **Medium density development:** Locating medium density development adjacent to major transit routes, (i.e. activity corridors) will ensure that a large number of residents, workers and shoppers have direct access to transit services, and will ensure that there are enough users to support high levels of transit service along the route.



Locate medium density development adjacent to major transit routes.



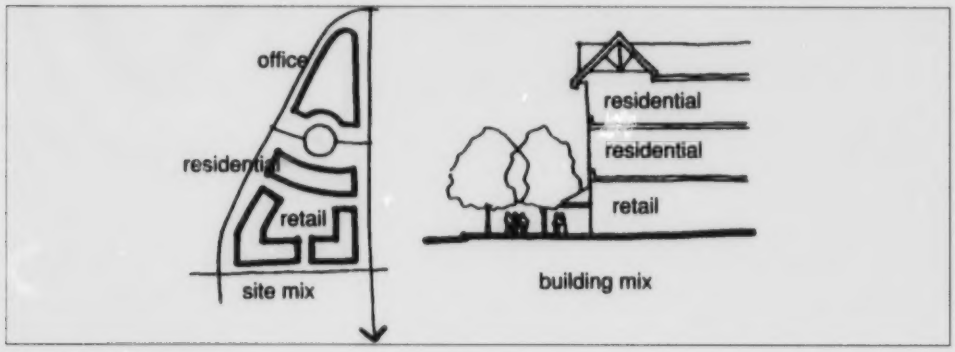
Encourage a mix of uses adjacent to major transit routes.

- **Encourage Mixed-Uses:** "Main Street" uses including medium density residential, retail, small shopping plazas, localized commercial, offices, small scale light industrial and entertainment activities will promote transit use along activity corridors by encouraging more balanced ridership levels, day-long transit use and a safer pedestrian environment (Guideline 2.2.4):

Mixed-use development along activity corridors could take several forms:

- Mixed-use development on individual sites, which might include various combinations of retail, commercial, light industrial, and residential.
- Different uses on different sites. Although individual sites may include only one use, the mixed-use character of the street would be preserved by varying uses between sites.

PLANNING SCALE: Regional/Area Municipal **URBAN SIZE: All**



Mixed-use development.
Adapted from: Burnaby Metrotown, Burnaby planning department, 1977

Action:

- Designate the existing and proposed transit routes which will serve as "activity corridors" in official plans and secondary plans. In most cases "activity corridors" will correspond with arterial roads serving as major transit routes.
- Encourage a wide variety of commercial, retail, residential, industrial, institutional recreational and cultural uses along the full length of mixed-use activity corridors. Activity corridors should incorporate a wider mix of uses than surrounding areas.
- Encourage medium density development along activity corridors. Development densities should be determined in consultation with transit operators and should be sufficiently high to support frequent transit service. The character of surrounding neighbourhoods should also be considered in this regard.
- As development intensifies along activity corridors, traffic will tend to become more congested. Provisions might therefore be made to incorporate transit priority measures along activity corridors, including High Occupancy Vehicle Lanes (Guideline 4.4.1).
- For a successful pedestrian environment along activity corridors, the design issues discussed in Guidelines 3.5.1 to 3.5.3 also need to be considered.

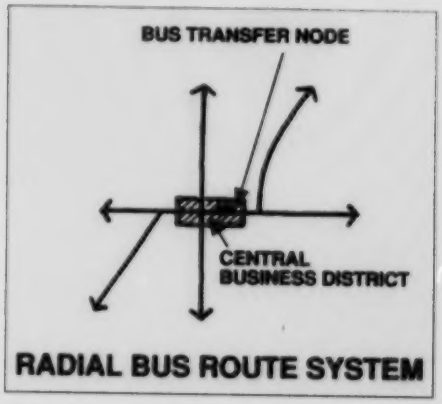
Guideline: 2.3.3

COORDINATE THE PATTERN OF NODES AND CORRIDORS WITH THE EVOLVING TRANSIT NETWORK

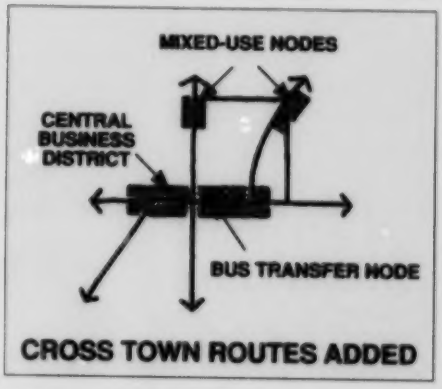
Background:

Residents will be more likely to travel to activity nodes by transit if they can be reached by a short transit trip, with a minimum of transfers. This suggests that larger urban areas should be served by a network of activity nodes.

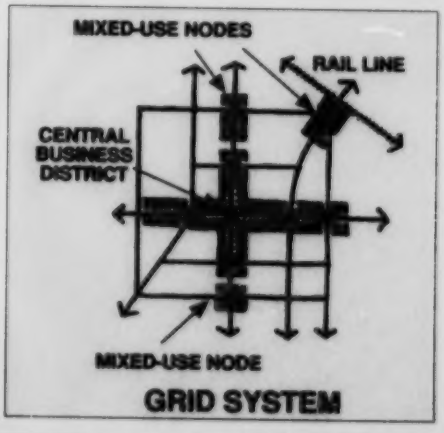
- **The number and pattern of activity nodes will vary according to the size of the urban area and the design of the transit system:** In smaller urban areas, most of the higher order retail, commercial and higher density residential uses are located in a single central business district. The transit system is usually based on a radial pattern with all routes converging on the downtown core. A strong central business area is necessary for a viable transit system, and new retail and commercial development should be encouraged to locate in the CBD. Only one central activity node will be required under these circumstances.



As the municipality grows, additional crosstown routes may be required to accommodate non downtown-oriented trips. Intersections between radial routes and crosstown routes can serve as locations for new subcentres which will encourage higher ridership levels in both directions along routes. Also a regional mall or other trip generators located on the periphery of the urban area can serve as secondary focal points for a radial transit system. More intensive development should be encouraged at such focal points to attract additional riders.



Large urban areas frequently have grid-based transit systems. Transit systems based on a grid pattern are generally more efficient than other forms, since they provide more equal access throughout the city, and are easily understood by users. Large urban areas should encourage development of a network of activity nodes and subnodes at points where transit routes intersect.



Planning Scale: Regional/Area Municipal/District/Neighbourhood **Urban Size: All**

- **The distance between major activity nodes will vary according to development densities in the urban area:** Generally, if activity nodes can be developed at short intervals throughout the urban area, then more people will live within a short transit ride of an activity node and transit will be seen as a viable alternative to the automobile. However, major activity nodes have to draw on a fairly large population base. In more densely developed urban areas, this population base can be located in a relatively small area. However, in low density urban areas, the population base will be spread out over a much larger area, requiring longer distances between activity nodes, and longer transit rides.
- **Transit routes should provide a direct link between activity nodes:** In larger urban areas, which have developed a network of activity nodes, transit routes should be designed wherever possible to provide a direct link between two or more activity nodes. This arrangement will help to balance the number of riders travelling in each direction along the routes, and will add to the choice of destinations and activities which can be reached along a transit route.

Action:

- Ensure that overall urban densities are sufficiently high to justify relatively short spacing between activity nodes.
- Designate a network of activity nodes in the urban area, which is suitable for the size of the municipality and the layout of the transit system.
- Plan the location of transit routes and activity nodes in consultation with transit agencies, to ensure direct transit links between transit services and activity nodes.

Guideline: 2.4.1

Locate Retail Shopping Centres and Office Uses Within Transit-Oriented Activity Nodes or Corridors

Background:

The location of trip-generating facilities, such as regional or sub-regional shopping centres or large employment facilities, will have a significant impact on the extent to which transit is used. If these uses are located as isolated developments in dispersed areas, it is unlikely that anything but a minimal level of transit service will be provided. Under these circumstances shoppers or commuters will have few alternatives to using private automobiles.

Isolated location with limited transit service encourages auto-dependency

Where possible, locate shopping and offices in transit-oriented areas

If large shopping facilities and employment centres develop as part of a higher density mixed-use node or corridor, larger number of users are likely to be attracted to the area. This may be sufficient to justify convenient transit access from a variety of locations within the urban area, even if the area is located some distance from other densely built-up areas. Under these circumstances, shoppers and employees will be more likely to use transit.

- The size of shopping centres and office facilities should be coordinated with the type of activity node or corridor in which they are located. Generally, large regional or sub-regional shopping centres, or large office developments should be restricted to the large activity nodes which are served by a variety of transit routes. Community shopping centres should also be located in activity nodes and/or along activity corridors, and should be developed in conjunction with employment or residential uses. Neighbourhood shopping facilities, small scale specialty retail, and low rise office uses should be located primarily along activity corridors, and clustered around transit stops (Guideline 2.4.2).
- In small urban areas, which have only one central activity node, new shopping and employment facilities should concentrate in the downtown core rather than in peripheral areas. For the most part, the central business area already serves as the focal point for the municipality's transit system. Focusing new employment and retail development within this central core will support transit use, and will also draw more people into the existing central core, strengthening the customer base for existing retail and commercial uses.

- In some cases it may not be practical to develop a large retail or employment facility in an existing activity node, or along an activity corridor. Under these circumstances, it is important that the proposed location becomes a focal point for transit routes, and that the proposed site has the potential to be intensified with additional higher density mixed-use development so that it can eventually develop into an activity node. This will be beneficial for the transit system, as it will encourage high ridership volumes in both directions along routes that serve the existing node. Guideline 3.6.1 provides more detailed information on designing routes to permit intensification in the future.

Action:

- Develop policies in regional and local official plans and secondary plans which encourage larger scaled employment and retail facilities to locate primarily in activity nodes and along activity corridors.
- If designated activity nodes and corridors are not suitable for the proposed development, then the proposed facility should be located in an area which has potential to develop as a transit-oriented activity node or sub-node. Transit operators should play a direct role in the planning process, and should be consulted in this regard.
- Official plans should include policies and criteria governing the establishment and location of new activity nodes. Locational criteria might include:
  - areas which can serve as intersection points for two or more major transit routes;
  - good access to the arterial and collector road network;
  - areas adjacent to existing large employment or retail facilities;
  - areas adjacent to higher density residential development.
- Employment and shopping facilities located in transit-oriented activity nodes can be developed with reduced parking requirements, which will act as a further incentive for customers and employees to use transit rather than private automobiles.

PLANNING SCALE: Neighbourhood/Site **URBAN SIZE:** All

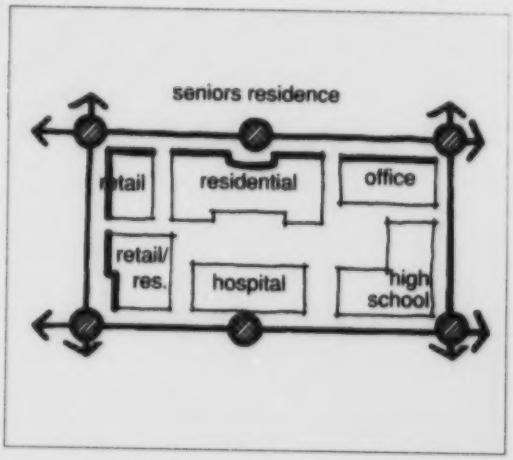
Guideline: 2.4.2

LOCATE TRIP GENERATORS AND FACILITIES FREQUENTED BY TRANSIT-DEPENDENTS AROUND TRANSIT STOPS

Background:

Facilities which are likely to be major trip generators, such as office buildings, recreational facilities, retail centres or high density residential uses should be located as close as possible to transit stops. This will ensure that people frequenting these activities will have good access to transit services, and that walking distances will be minimized. Shorter walking distances will act as an incentive for potential transit users.

Similar considerations also apply to specialized uses such as senior citizens' residences, junior and senior high schools, colleges and universities, hospitals, community centres, or social services, which are frequented by a high proportion of transit-dependents, some of whom may have restricted mobility (such as senior citizens or out-patients).



Cluster facilities frequented by transit-dependents or mobility-impaired people around transit stops.

- Locating these uses close to transit stops will avoid the need to divert buses from otherwise efficient routes and adequately designed roadways, in order to provide direct transit service.
- It will also make transit use more convenient for transit-dependents or users with impaired mobility.
- Placing neighbourhood and convenience retail facilities at bus stops located adjacent to residential areas will allow transit users to run errands or shop on their way home from work. This also facilitate off-peak shopping and other day to day activities.

Action:

- If possible, the location of major trip generators and uses frequented by transit-dependents should be decided either after or in conjunction with the selection of transit routes and bus stop locations.
- Consult with transit operators when reviewing development applications for these uses, to determine the location of transit routes and stops in relation to the proposed development and the adequacy of transit services to the site.

Guideline: 2.4.3

IN INDUSTRIAL DISTRICTS, ENCOURAGE HIGHER DENSITY MIXED-USE DEVELOPMENT ADJACENT TO TRANSIT ROUTES

Background:

Large industrial districts and business parks, particularly in newer suburban areas, tend not to be transit-supportive. Development densities are low, buildings are set far back from the street and walking distances from transit routes to the interior of the industrial area can be too long to encourage transit use.

Suburban industrial parks tend not to be transit-supportive, because of low densities and long walking distances

One way to make industrial and business districts more transit-supportive is to encourage intensification and a greater mix of uses, including residential, along the transit routes which serve these districts.

- Uses located adjacent to transit routes can include higher density office uses, restaurants, retail stores, light industrial uses, and studios. Uses which can house significant numbers of employees in a small area should be located adjacent to transit services. This will minimize walking distances to transit for a significant proportion of employees, making transit more convenient and attractive. It will also increase the number of potential transit users located adjacent to transit services, which may permit higher levels of transit service (Guideline 2.2.3).

Locate a mix of higher density industrial, commercial and residential uses adjacent to transit routes

- Higher density residential uses should also locate along these transit routes, to encourage more balanced ridership patterns (Guideline 2.2.4). In practice, few firms in prestige industrial or business parks are inherently incompatible with residential uses. Higher density residential uses will become more appropriate as transit routes in industrial areas take on more of a "mixed-use" character, and less of an "industrial park" character. Other factors such as proximity to schools, park space and community services will also affect the appropriateness of residential uses. In certain cases, residential uses and industrial/commercial uses can be located in different parts of the same building or site, provided that the non-residential uses do not create noise or other negative environmental impacts.
- As distance from transit routes increases, employment densities can be reduced to accommodate larger manufacturing firms and warehousing or truck transportation firms which require extensive land areas for buildings and storage. These uses should not be located adjacent to transit routes.
- Generally, the standard 400m maximum walking distance to transit services (Guidelines 3.3.2 and 3.4.1) still applies in industrial areas. However, because many manufacturing firms require large lot sizes and low employment densities, this standard will be difficult to achieve for properties located in the interior of industrial subdivisions. Walkways and well designed road patterns can also reduce walking distances. Company shuttle buses between transit stops and the interior of industrial areas could also play a role.
- If sufficiently intensive uses are located along transit routes, a majority of employees in the industrial area can still be located within a short walk of transit services.

Action:

- In industrial areas, designate lands located near transit routes for high intensity employment uses, retail and entertainment uses, and service establishments. Also permit higher density residential uses along transit routes, provided that adequate community services, parks and schools are located in the surrounding neighbourhood, and surrounding non-residential uses would not have a negative environmental impact on residential uses.
- Establish an overall minimum density for industrial areas which will support transit use.
- In existing industrial areas, encourage intensification along transit routes.
- Consult with transit operators when designating industrial areas, to determine overall density requirements and the proportion of high density to low density development required to support superior levels of transit services.

PLANNING SCALE: Regional/Area Municipal **URBAN SIZE:** All

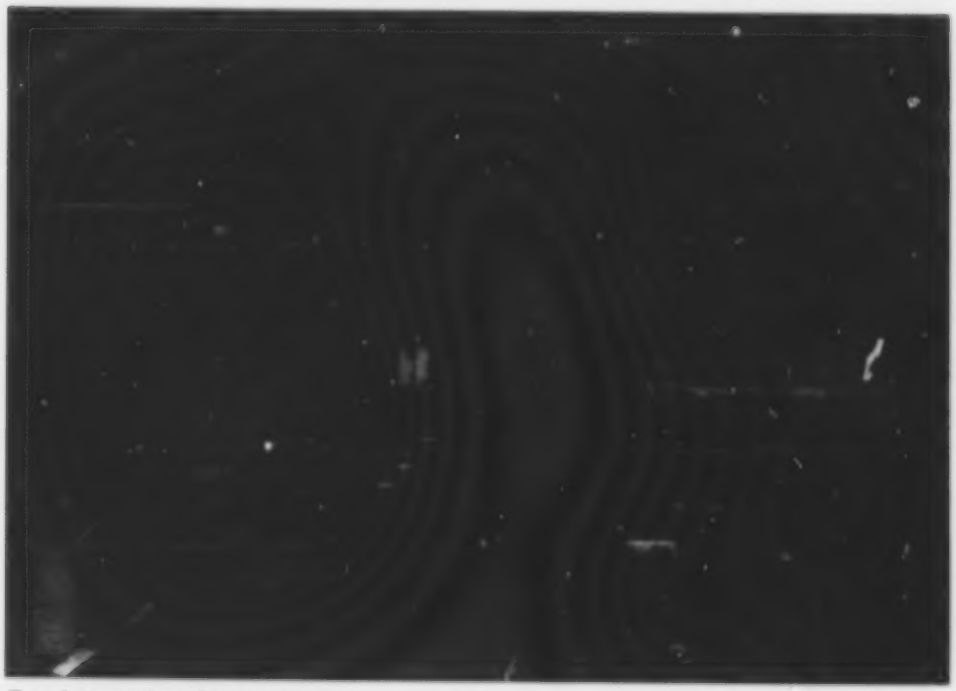
Guideline: 2.5.1

ENSURE THAT URBAN AREAS ARE APPROACHING TRANSIT-SUPPORTIVE DENSITIES BEFORE EXPANDING THE INTERIM URBAN BOUNDARY

Background:

Conceptually, a transit-supportive urban structure includes the following elements:

- High density, mixed-use development concentrated into transit-oriented "activity nodes".
- Medium density, mixed-used activities along the full length of arterial roads and collector roads serving as transit routes.
- Lower density uses, most likely residential, in the intervening areas.



Transit-supportive urban structure.

However, in urban areas where there is a preference for single family housing, there may be a tendency to develop lower density uses first, while higher density activity nodes and corridors may not intensify for some time. If urban boundaries are expanded before the higher density nodes and corridors begin to intensify, it will be very costly to provide high quality transit services to new urban areas.

PLANNING SCALE: Regional/Area Municipal **URBAN SIZE: All**

Action:

The supply and cost of raw land available for development has an important influence on development densities. To encourage transit-supportive densities and a better balance between higher and low density development municipalities should:

- Avoid pre-servicing areas outside of the existing interim urban boundary with municipal sewer and water services.
- Designate target densities in official plan documents for activity nodes, corridors and lower density areas which will ensure that overall urban densities are sufficiently high to support high quality transit services. Transit operators should be consulted in this regard.
- Avoid designating additional land for urban development until densities in existing urban areas begin to approach the target levels set out in official plans.
- Site-specific amendments to permit reduced densities or non-transit-supportive uses at activity nodes and corridors should be avoided if the proposed amendment could interfere with the intensification of surrounding properties.
- Review development trends on a regular basis to determine the extent to which new development is approaching the target densities set out in official plans.

Trade-offs will be involved in phasing the expansion of urban boundaries to encourage transit-supportive densities. A supply of readily developed vacant land is required at all times to ensure an efficient land market. Delaying the expansion of urban boundaries until target densities in existing urban areas have been met or exceeded could lead to excessive land prices and lack of competition in the market. Premature expansion of urban boundaries will reduce incentives to develop at higher densities (Guideline 2.2.1).

The municipality must balance these two concerns when reviewing applications to expand the urban boundaries. If there is evidence that intensification is occurring at nodes and corridors, and if overall densities are approaching the targets established in policy documents, then it may be reasonable to expand urban boundaries even though substantial infilling potential still exists at activity nodes and corridors.

Guideline: 2.5.2

ASSESS THE COSTS AND BENEFITS OF EXTENDING TRANSIT SERVICES BEFORE APPROVING DEVELOPMENT APPLICATIONS OUTSIDE OF THE EXISTING AREAS SERVED BY TRANSIT

Background:

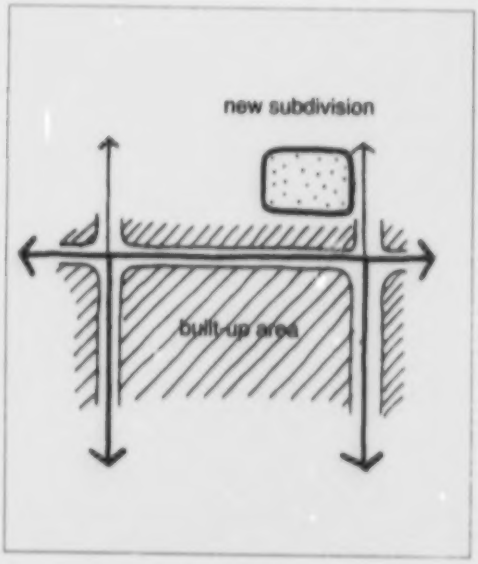
To encourage transit use in new subdivisions, convenient transit service should be made available to residents as early as possible. Early provision of transit services can intercept a large portion of automobile travel, perhaps eliminating the need for new residents to purchase a second car.

However, as the distance between new subdivisions and the existing developed area increases, the cost of providing transit services will increase as well. Eventually costs may rise to the point where it is no longer financially feasible to provide reasonable transit service, depending on the density and mix of land uses provided along transit routes.

To minimize the cost of extending transit services, new development should proceed in a logical fashion, and should generally be located adjacent to existing developed areas and transit services.

In reality, trade offs are required, since it is difficult to phase new development this specifically. For example, if a parcel of land is designated for urban development in an official plan or secondary plan, the development has good access to an existing arterial or collector road which could serve as a transit route, and the developer is willing to extend sewer and water services to the site, then it may be reasonable to approve the application, even if it is located some distance from existing developed areas.

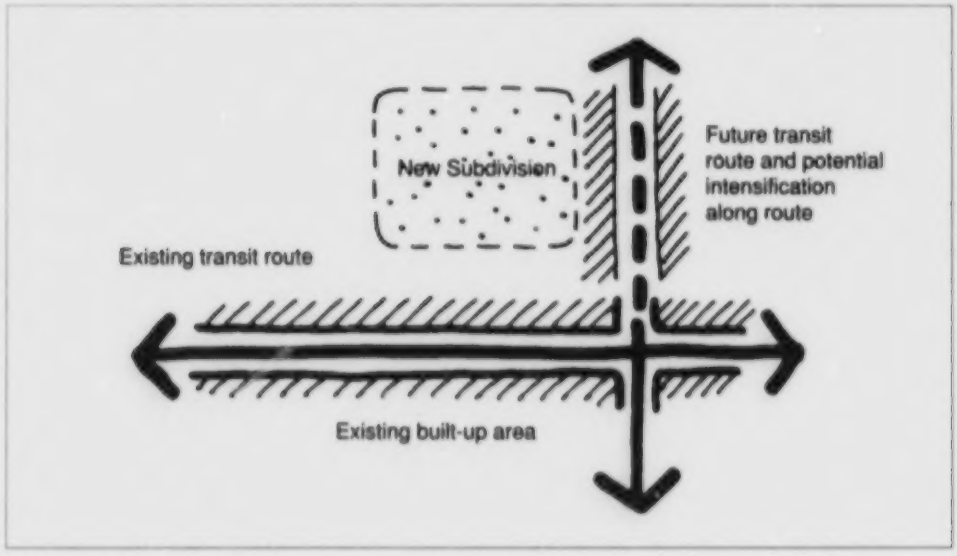
Under these circumstances, the municipality should review the feasibility of extending transit services to the site with the transit operators. If properties located between the existing urban area and the proposed subdivision are likely to be developed over the short term, and the proposal will be developed at a transit-supportive density, then it may be reasonable to extend transit services to the site even if it is not immediately cost-effective to do so. Other factors which should be considered when evaluating an extension to the transit system include the extent to which a route must be extended to serve the new subdivision; whether or not the running time of existing services allow an extension; and the cost of providing additional buses to serve the route, if required.



Locate new subdivisions adjacent to built-up areas to minimize transit costs.

Extending transit services under these circumstances could present several advantages:

- It would provide an immediate alternative to automobile use in the proposed development.
- Established transit services along the arterial road could provide an incentive to develop higher density, more transit-oriented uses along the arterial road.


New Subdivision
Future transit route and potential intensification along route
Existing transit route
Existing built-up area

Early provision of transit service can encourage more transit-supportive development in the future.

Action:

- Major development applications should be reviewed by transit operators. The costs of providing transit services to the proposed development should be factored into the evaluation process just as the costs of expanding water and sewer services are carefully examined by municipalities and developers.
- The municipality and transit operators should provide early transit services to areas undergoing new development. The cost-effectiveness of doing so should be assessed in each instance by means of specific studies. A more general policy to this effect may be adopted by municipal Councils, possibly as part of Official Plans.
- Designating in advance the roads which will serve as major transit routes, installing bus stops early during subdivision construction, and providing transit service during the early development of the subdivision can play an important role in encouraging transit use.
- Ideally where roads designated as transit routes are not yet constructed, they should be built in advance so that bus service can get into and pass through subdivisions early in the development process. The front-end costs of achieving this may be justified subsequently by less need for road capacity expansion and lower land development, environmental and energy costs, all resulting from lower levels of auto-dependency.

PHYSICAL DESIGN

CHAPTER 3

DESIGN OF CONNECTORS AND PUBLIC SPACES

Since transit cannot usually provide universal door-to-door access, transit users are pedestrians at both ends of the trip. Transit-friendly urban design must place primary importance on the needs of pedestrians. The guidelines in this chapter address pedestrian needs in terms of several broad principles:

- At the subdivision or neighbourhood scale, streets should be designed to minimize walking distances between internal residential or employment areas and transit stops. Generally transit users are unlikely to walk more than 400 m to a transit stop. Internal streets should be designed to provide direct walking routes to transit stops. In addition, transit routes should be spaced at 1000m maximum[1] intervals, on average, and bus stops should be spaced at 200 m to 250 m intervals to meet walking distance criteria.
- At the streetscape level, major transit routes should incorporate the following elements to provide a pedestrian-friendly environment:
  - buildings should be oriented toward the street and should be built close to the streetline, to improve access and reduce walking distances;
  - uses such as stores, restaurants, services, etc. which are oriented toward pedestrian traffic, should be located at grade;
  - pedestrian and transit user amenities, such as wide sidewalks, bus shelters and waiting areas, street trees and landscaping, and canopies or arcades along buildings should be provided along major transit routes, with careful attention to aesthetic design.

The guidelines also address the needs of transit vehicles. Arterials and collectors should be continuous across neighbourhoods and subdivisions, to ensure that transit routing is as efficient as possible; transit routes should be spaced so that they cover as much of the urban area as possible with a minimum of overlap between routes; and transit routes should be designed to a sufficiently high standard to be able to accommodate transit vehicles.

Finally, certain specialized uses such as regional shopping plazas and transit transfer nodes can act as focal points for future intensification and development of activity nodes. Although these uses may initially be developed in an auto-oriented fashion, they should be designed in such a way that they can easily accommodate transit-oriented intensification in the future. If designed in this manner, they can help to encourage two-way ridership patterns on routes which serve them, thereby increasing the efficiency of the transit system.

[1] Note that this recommendation is intended to be flexible, since the original concession road spacing in Ontario generally varies between 3/4 mile (1.2 km) and 1 1/4 mile (2 km).

Guideline: 3.2.1

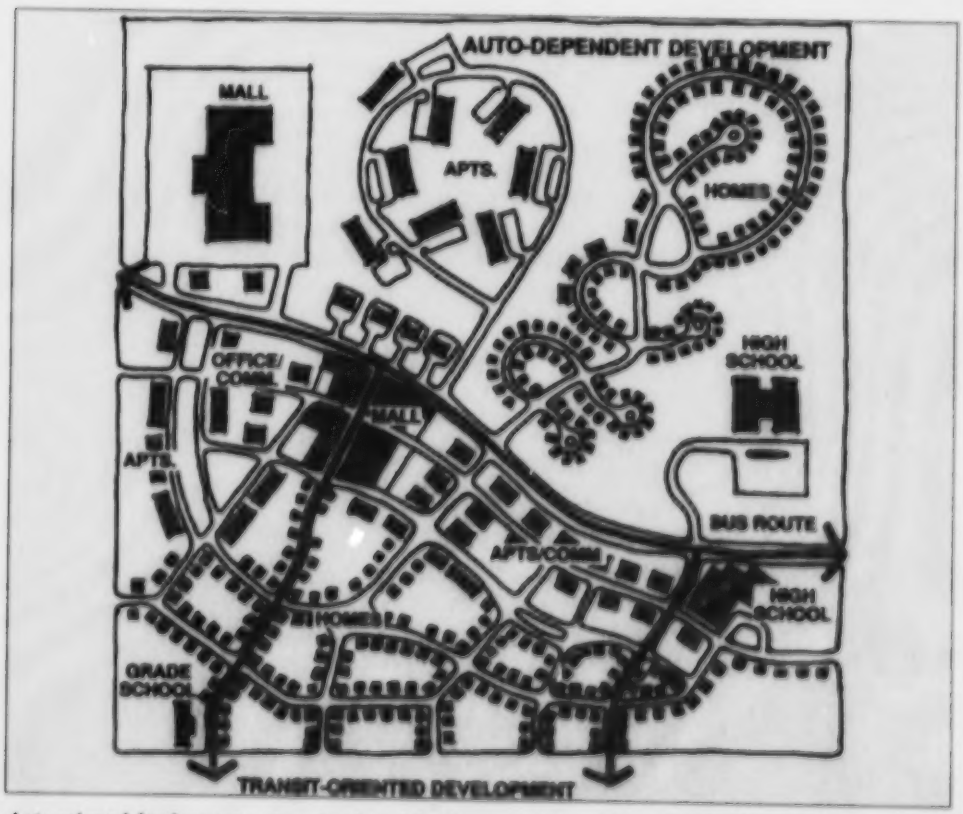
CREATE A MORE TRANSIT-SUPPORTIVE DEVELOPMENT PATTERN

Background:

Most arterial roads in new urban areas are bordered by shopping centres or apartment buildings which are set well back from the street, or simply the back fences of rear yards. Surrounding residential subdivisions focus on internal roads and have only limited access to surrounding arterial roads, as shown in the top half of the illustration below.

This pattern of development is not transit-supportive because it does not encourage pedestrian activity and through transit routes are remote from most origins and destinations.

- Arterials are wide, noisy and are designed mainly to move large volumes of traffic. They do not provide a hospitable environment for pedestrians.
- Arterials are too wide to cross easily and crossing points are limited.
- Pedestrian-scale activities and interest points are limited.
- Limited access between subdivisions and arterial roads discourages residents from walking to arterial roads.
- Limited pedestrian activity and lack of street-related development along arterials create potential safety problems, particularly at night.



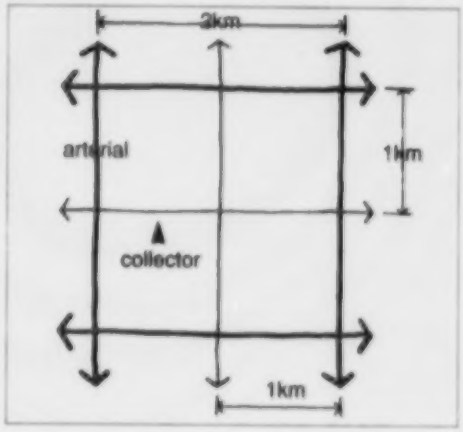
Auto-oriented development vs. transit-oriented development. Adapted from: The Traditional Neighbourhood Development: How will Traffic Engineers respond?, by Frank Spielberg; ITE Journal, Sept. 1989.

PLANNING SCALE: All **URBAN SIZE: All**

Action:

Resolving these problems will require a comprehensive approach to the design of urban areas, as shown in the bottom half of the preceding illustration and summarized below.

- **Develop a finer grid of arterial and collector roads:** The typical 1 1/4 mile (2-km) concession road grid is too wide for convenient pedestrian access to transit routes (Guideline 3.3.2), and arterials and collectors are too few in number to prevent high traffic volumes. A finer grid of arterial and collector roads will help to disperse traffic and reduce traffic volumes so that individual arterials can be developed in a more pedestrian-supportive fashion. With a finer grid of arterials and collectors, it would be possible to intensify uses along these routes without creating excessive levels of traffic congestion.



Develop a finer grid of arterial & collector roads.

- **Develop pedestrian and transit-supportive uses along arterials:** Developing higher density, mixed uses (including residential) along arterials will encourage pedestrian activity by creating a more interesting environment, and support transit use by ensuring that larger numbers of people live and work adjacent to transit (Guideline 2.2.3). To encourage pedestrian activity, uses should be oriented to the street and to pedestrian traffic and uses such as retail stores, restaurants and services should be located at grade (Guidelines 3.5.1 and 3.5.2). Avoid reverse lotting adjacent to arterials.
- **Improve access between arterial roads and internal subdivisions:** Pedestrian access between internal subdivisions and arterials must be convenient if residents are to use transit. Walking distances must be short and walking routes must be direct (Guideline 3.4.1). Access can be improved by providing mid-block pedestrian walkways. However, a better solution from a safety standpoint is to design subdivisions so that walking distances to arterials can be minimized along residential streets (Guideline 3.4.1).

Stores and restaurants at street level encourage pedestrian activity.

Guideline: 3.2.2

Develop Compact, Pedestrian-Oriented Activity Nodes

Background:

- **Activity nodes should be designed for ease of pedestrian and transit access:** Travelling by transit is also a pedestrian activity. Transit users (except those using auto access to stations) must walk from their homes to the nearest transit stop, and must walk to their destinations at the end of the trip. To maximize convenience for transit users, activity nodes should be compact, and activities should be within walking distance of each other.
- **The design of an activity node will vary, depending on the transit modes which serve it:** If an activity node is served by surface bus or streetcar lines, then uses should be street-oriented, and major building entrances should be oriented to transit stops (Guideline 3.5.1). Streetscapes should be designed to provide a wide range of amenities for pedestrians and transit users (Guideline 3.5.2). Wherever feasible, uses which relate directly to pedestrian activities such as stores or restaurants should be located at street level (Guideline 3.5.2).
- In cases where activity nodes are also served by rapid transit or commuter rail stations, then uses such as retail stores, food stores, offices, etc. may also be incorporated into the design of the station or be located adjacent to it.
- **Transit routes should penetrate into the interior of the activity node:** To maximize access and convenience for transit users, transit routes and the arterials or collector roads which they use should travel directly into the interior of activity nodes. Transfer points between transit routes should be concentrated near the centre of activity nodes. Rapid transit or commuter rail stations should also be located near the centre of activity nodes. To improve the pedestrian environment, parking lots should be located in rear yards or underground.

Activity nodes should have street-oriented buildings.

- Activity nodes should be designed to be easily accessible for pedestrians living in surrounding residential neighbourhoods.

Action:

- Official Plans and zoning by-laws should include policies which require activity nodes to be designed to facilitate pedestrian and transit use. This can be accomplished by:
  - establishing physical boundaries for activity centres which will ensure that they remain compact;
  - establishing maximum and minimum densities which permit and encourage concentrated development;
  - including policies which encourage street-oriented development in activity nodes;
  - requiring large developments to provide direct links to rapid transit/commuter rail stations (where applicable);
  - enacting zoning by-laws which permit reduced, or zero, front yard depths and/or maximum setbacks in activity nodes, to encourage street-oriented development;
  - where appropriate, enacting zoning regulations which require parking lots to be located at the periphery of activity nodes, or in rear yards/side yards of individual sites.

Guideline: 3.3.1

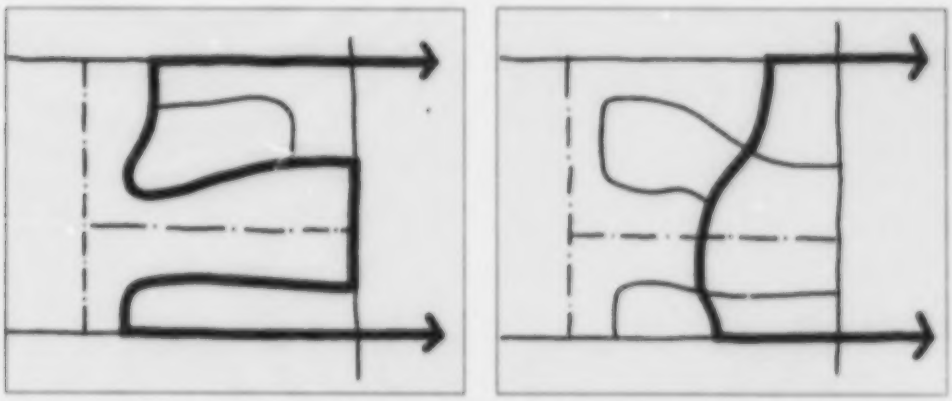
ARTERIALS AND COLLECTORS SHOULD BE CONTINUOUS ACROSS NEIGHBOURHOODS, AND SHOULD PROVIDE DIRECT ROUTES FOR BUSES

Background:

To improve the attractiveness of transit, arterials and collectors should be designed to provide as direct a route as possible, to minimize trip length and travel time and to avoid backtracking. Roads which permit direct and efficient routing for transit vehicles also reduce the costs for transit operators, and result in a more comfortable ride for passengers.

Arterials and collectors should be designed comprehensively so that they provide direct access across a number of subdivisions and neighbourhoods. If arterials and collectors are not continuous between subdivisions and neighbourhoods, buses may have to take several detours to travel between subdivisions or neighbourhoods. This will add to trip length and discourage transit use.

In some cases, heritage and natural features (such as valley lands or other major land forms) may interfere with the continuity of arterials and collectors. When these features are important from a cultural or environmental standpoint, the municipality, transit-operators, and other interest groups will have to carefully consider the trade-offs involved in either protecting the feature, extending the arterial/collector road network, or developing an alternate and perhaps more circuitous route which by-passes the natural or heritage feature.



Providing a direct link between subdivisions creates more efficient transit routing.
Adapted from: Guide To Transit Considerations, Transportation Association of Canada 1991.

Action:

- Comprehensive planning of arterial/collector road system on an area municipal-wide basis is required to ensure that adjacent developments and neighbourhoods are linked with direct transit-compatible roads.
- Comprehensive road network planning at the district and neighbourhood scale is also necessary, to ensure that minor collectors are designed to be continuous and fit into an overall transportation system.

Planning Scale: Regional/Area Municipal/District/Neighbourhood **Urban Size:** All

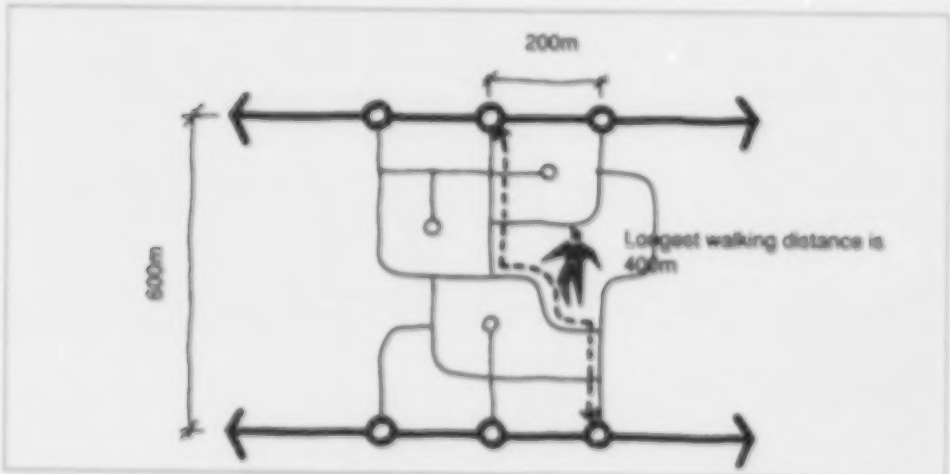
Guideline: 3.3.2

Collector and Arterial Roads should be Located no Further than a Maximum of 1000 m Apart

Background:

To optimize transit services and the cost of constructing road infrastructure, transit routes (and the arterial and collector roads which carry them) should be spaced sufficiently far apart to avoid overlapping coverage between routes and be sufficiently close to permit full coverage.

The maximum distance that most transit users are willing to walk to a bus stop is 400 m (Guideline 3.4.1). If bus stops are located 200 m apart (Guideline 3.4.2), and service is only offered in one direction (e.g. east-west as illustrated), then the resulting walking distances from the interior of a block will, in general, be no more than 400 m. Spacing between collectors and arterials would therefore need to average 600 m to satisfy the walking distance criterion.



With collectors 600m apart and bus stops every 200m, virtually all residents are within 400m of a bus stop. Adapted from: Guide to Transit Considerations, Transportation Association of Canada 1991.

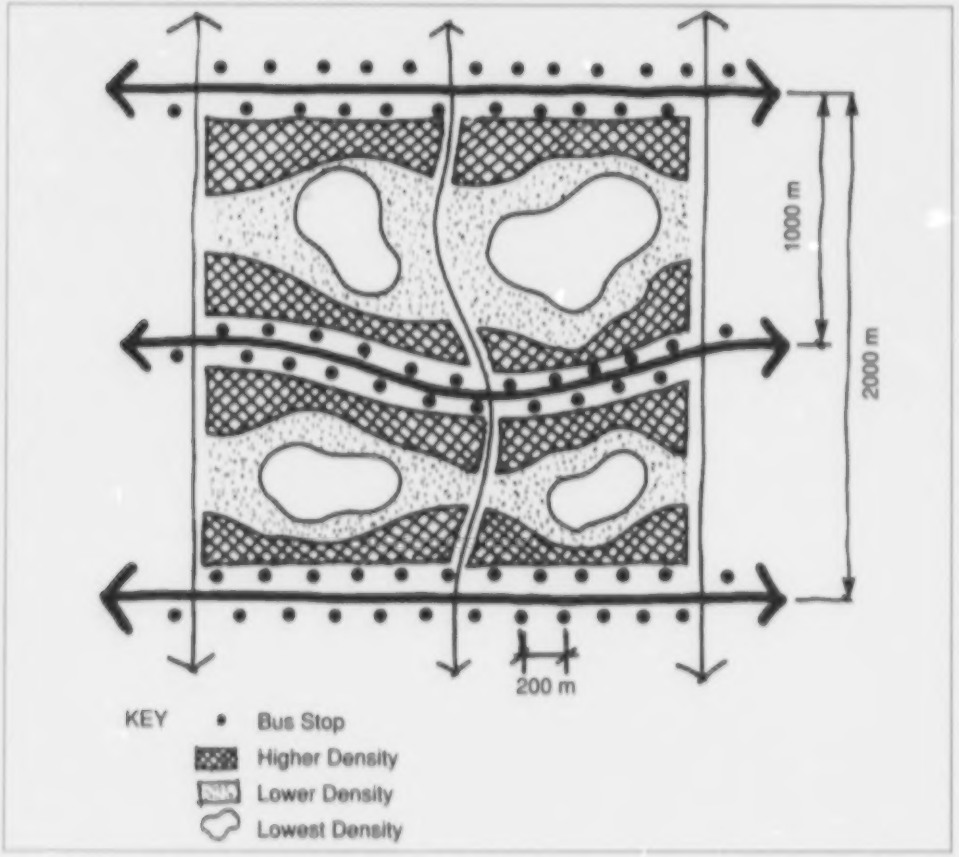
In many Ontario urban areas, concession roads are spaced 1-1/4 mile (2 km) apart. Developing two additional mid block collectors, 600 m to 700 m apart, between existing collectors, would fully satisfy the intent of the guideline.

However, even providing a single mid block collector at a 1000 m spacing places about 90% of the land within 400 m of a bus stop, if service is provided along all four arterial or collector roads forming a block.

Most smaller municipalities use a transit system composed of radial routes emanating from a central point, such as the downtown or a major shopping area (Guideline 2.3.2). In such a system, provision of service to a new area usually consists of extending one or more radial routes, initially providing service along one major road only. As demand grows, service may be provided in the crossing direction.

In such cases, mixes of density may be used to satisfy the maximum walking distance criterion. If higher density residential uses are located along collectors and arterials

(Guidelines 2.2.3 and 2.3.2), then a substantial proportion of residents will be located within a short walk of transit services, even with 1000 m mid block collectors and no transit service in the crossing direction.



Higher densities along transit routes allow a majority of people to be within a comfortable walk of transit service, even with 1000m collector spacings, and service in one direction.

In summary, a maximum distance of 1000 m between collectors should satisfy the walking distance criterion, and allows a greater flexibility in subdivision layout. This flexibility is particularly useful when the parcel of land is to include a relatively large land-use feature, such as a park or other open space use.

Action:

- Designate a system of arterial and collector roads in official plans and secondary plans, which provides for a maximum spacing of 1000 m between these roads.
- In reviewing plans of subdivision, ensure that a sufficient number of mid-block collectors are provided to meet the transit walking distance criterion; in low-density suburbs, two collectors may be required, while one collector should be sufficient in subdivisions with higher density uses along arterials and collectors.

Guideline: 3.3.3

Collector/Arterial Roads Should be Designed and Engineered to Accommodate Transit Vehicles

Background:

The following design issues can facilitate transit vehicle access along arterial and collector roads:

Design Arterials and Collectors to Accommodate Full-Sized Buses. In older neighbourhoods, buses sometimes have to use collectors which were never designed to handle full-sized buses. This reduces travelling speed for the bus, can create safety hazards, and results in a slow, uncomfortable transit ride. To facilitate conventional transit access, all roads designated as transit routes should meet the following design standards[1]:

- The recommended minimum turning curve radius for a bus (both standard and articulated) is 15 m.
- Recommended minimum lane width is 3.5 m along straight sections of the road plus an additional 0.5 m along a 15 m radius curve.
- Recommended minimum paved surface width for the road is 9 m.
- Recommended maximum grade is 5%, although this standard may not be achievable in all locations.
- Information of this type is also available in guidelines published by the Ministry of Transportation, such as "Transit Terminal Design Guidelines".
- Roads being used as bus routes should conform to design standards for local collector roads which govern surface and subsurface materials and depths. The Ministry of Transportation publishes design guidelines for arterial and collector road designs. These standards should also apply on bus loops and turnarounds, and at terminals at shopping malls.

Avoid one way street systems. A number of municipalities have adopted one-way street systems, particularly in congested areas, to facilitate automobile traffic movement. However, one way street systems are disruptive to transit systems, confusing and inconvenient for riders, and can result in longer transit trips. One alternative is to reserve a special "contraflow" lane for transit vehicles only (Guideline 4.4.1).

Avoid bus bays. Bus bays are off-street bus stops, which require the bus to pull off the main traffic lane to pick up and unload passengers. Bus bays are used to avoid traffic slow downs when buses stop. However, after pulling off, buses find it difficult to re-enter the traffic stream, particularly in congested conditions. This can add significantly to travel times for transit users.

Provide continuous left turn lanes. On arterial roads carrying high volumes of traffic, cars stopping to make left turns can significantly impede traffic flow and delay transit vehicles. One potential solution is to provide a continuous left turn lane along the centre of the arterial. Although this may require some widening of the road, it is a preferable alternative to building an additional traffic lane in each direction.

[1] Transportation Association of Canada "Guide to Transit Considerations in the Subdivision Design and Approval process" 1991.

PLANNING SCALE: Regional/Area Municipal/District/Neighbourhood **URBAN SIZE: All**

Action:

- Ensure that local municipal standards for collectors are sufficient to support transit vehicles.
- In reviewing a plan of subdivision, ensure that all collector roads are designed to the municipal standard for collectors. In particular, ensure that roads which will likely serve as collectors are not being designed to local residential street standards.
- Avoid the use of one way street systems and bus bays which can improve traffic flow but tend also to reduce the efficiency of transit.

Guideline: 3.3.4

Arterial/Collector Roads Should be Designed to Accommodate Pedestrians

Background:

Transit users are pedestrians at both ends of the trip. Efforts to accommodate the needs of pedestrians are therefore equally as important as efforts to accommodate transit vehicles along arterial and collector roads. The following design approaches can facilitate pedestrian use of arterial and collector roads:

- **Design intersections to accommodate pedestrians as well as vehicles.** Many current design standards for arterial road intersections call for specialized treatment of turning movements (e.g. right-turn channels and lanes, double left-turn lanes, wide turning radii) where they are warranted by traffic volumes. While such treatments can improve traffic flow, they can also create wide, unfriendly barriers to pedestrian movement. Also, some treatments make the proper positioning of transit stops a difficult matter. Any intersection improvements should balance the needs of pedestrians, transit, automobiles and other vehicles.

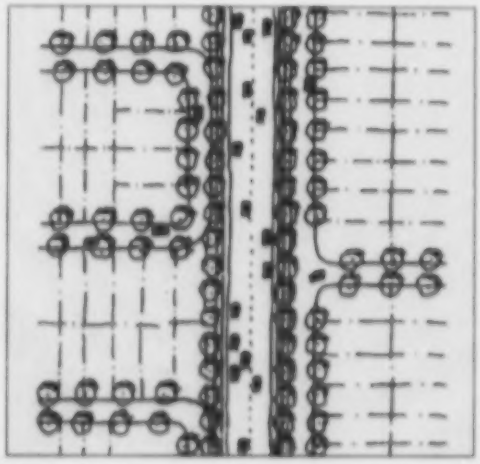
Some arterial road intersection designs fail to recognize pedestrian and transit needs.

- **Reduce Intersection Spacing Along Arterial/Collector Roads.** Allowing much shorter distances between intersections along arterial/collector roads can provide several benefits. More frequent intersections improves pedestrian access to shopping and other activities which may be located along major roads, and also reduces walking distances to transit stops. Frequent intersections will also provide more alternative paths for automobile traffic, potentially reducing traffic congestion along arterials and collectors. Guideline 3.4.2 suggests a maximum of 200 m to 250 m between intersections along arterials; even shorter blocks are common along older, transit-oriented shopping streets.
- **Increase the Number of Protected Crossing Points Along Arterial Roads.** The distance between protected pedestrian crossing points, such as signalized intersections and crosswalks, plays a major role in determining the accessibility of transit users to bus service. Since buses travel in both directions along routes, transit users must be able to

cross the street quickly and safely, without having to walk a long distance to a signalized intersection. This is a significant problem in newer urban areas where municipal design criteria for arterial and collector roads frequently result in relatively long distances between intersections.

- **Reduce Spacing Between Arterial and Collector Roads.** Because arterial roads are widely spaced in many urban areas (usually 2 km apart if they follow the typical township road grid), they must be designed with multiple lanes to accommodate high traffic volumes. Developing mid-block collector/arterial roads at 600 m to 1000 m intervals, as discussed in Guideline 3.3.2, would help to disperse through traffic, and could result in lower traffic volumes along individual roads. This strategy would be beneficial both to pedestrians and transit vehicles. Lower traffic volumes would create a more attractive environment for pedestrians and would make it easier for pedestrians to cross these roads. Reduced traffic volumes would facilitate the implementation of transit priority measures such as high occupancy vehicle lanes (Guideline 4.4.1) and could eliminate the need to widen arterial/collector roads to accommodate bus only lanes.

- **Avoid Reverse Lotting Along Arterials and Collector Roads.** Reverse lotting along arterial and collector roads creates a sterile and potentially dangerous environment for pedestrians. It also makes future intensification along the arterial or collector very difficult, because uses front onto internal roads rather than the arterial. Developing higher density, street-oriented uses along both sides of arterials is the most transit and pedestrian-supportive solution. However, as shown in the diagram, a system of service roads, or looped local roads, located parallel to the arterial, may be an appropriate alternative in some residential areas.



Alternatives to reverse lotting along collector roads in low density subdivisions.

Action:

- Revise municipal design standards to permit reduced spacing between intersections along arterial and collector roads;
- Revise municipal design standards for traffic intersections to facilitate pedestrian use. In particular, avoid channelized right turn lanes, large turning radii, and double left turn lanes, where possible;
- In reviewing proposed intersection improvements, ensure that the needs of pedestrians crossing the intersections, and of transit vehicles stopping nearby, are considered alongside the needs of automobiles and other vehicles.
- When reviewing plans of subdivision, explore alternatives to traditional reverse lotting along arterial and collector roads.

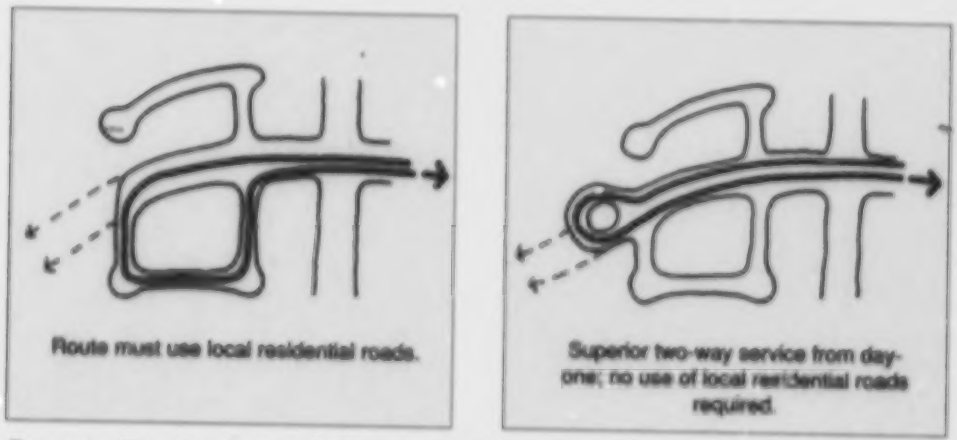
Guideline: 3.3.5

PROVIDE A TEMPORARY BUS TURNAROUND AT THE END OF PARTLY CONSTRUCTED ARTERIAL/COLLECTOR ROADS

Background:

As discussed in Guideline 2.5.2, early provision of roads which will carry transit in new developments is desirable to help form the "transit habit". However, there may be cases where providing such roads is difficult. In such cases, the construction of temporary bus turnarounds is an interim alternative.

Temporary bus turnarounds provide three major advantages during subdivision phasing. First, transit services can be restricted to the collector or arterial road; operation on local streets to complete the bus route becomes unnecessary. Secondly, temporary turnarounds allow transit service to be phased in as new development proceeds. Finally, turnarounds allow for much more attractive and efficient two-way routes, as opposed to the less desirable one-way open loop route.


Route must use local residential roads.
Superior two-way service from day-one; no use of local residential roads required.

Turn around loops keep buses off local streets and allow superior two-way service.

Action:

- If it is not feasible to provide through transit service initially, consider providing temporary bus turn-arounds when phased subdivision development is proposed, rather than using local streets as a one-way loop to turn the buses around.

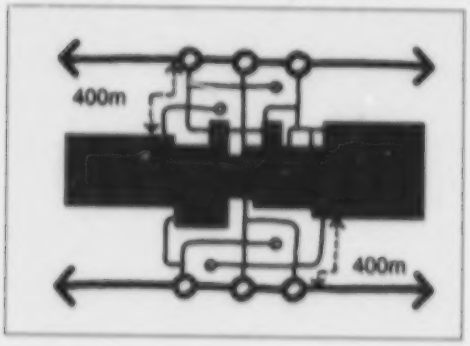
Guideline: 3.4.1

Design Subdivisions to Facilitate Pedestrian Access to Transit Stops

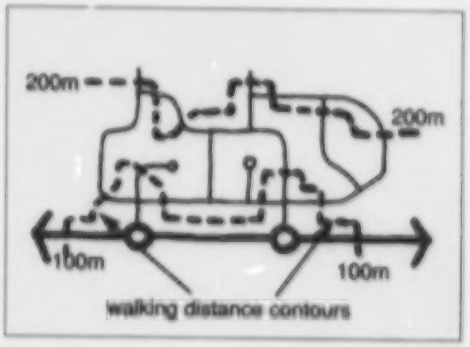
Background:

Transit users are sensitive to the distance they must walk to a transit stop. Long or circuitous routes will discourage people, even if the quality and frequency of transit service is good.

In most post war subdivisions, streets are designed to discourage through traffic, by using circuitous road patterns and cul-de-sacs. As a result, many residents do not live within comfortable walking distance of transit stops.



Large areas of the subdivision are located more than 400m walking distance from a transit stop.

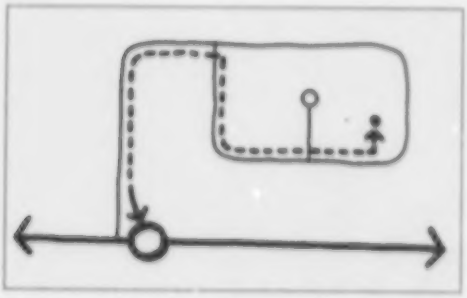


Applicants should document walking distances to transit in conjunction with draft plan submissions.

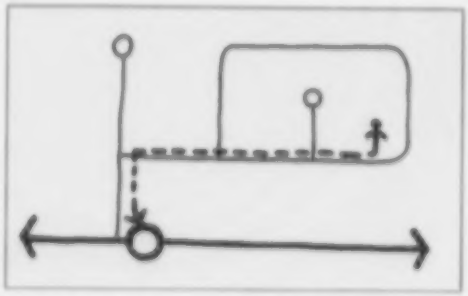
Adapted from: Guide to Transit Considerations, Transportation Association of Canada 1991

- Subdivisions should be designed so that a significant majority of residents or jobs are located 400 m or less from a transit stop. The maximum distance that transit users are willing to walk depends on numerous factors such as topography, presence of sidewalks, weather and age. A maximum walking distance of 400 m to a transit stop is the commonly accepted standard in North America.
- To help to achieve this standard, properties located adjacent to transit routes should be designated for higher density development (Guideline 2.2.3), and transit routes should be located a maximum of 1 km apart. (Guideline 3.3.2).
- **Provide sidewalks along transit routes.** Sidewalks should be developed along both sides of transit routes within, or adjacent to, a subdivision. Sidewalks should be provided on at least one side of every residential and industrial street as well. Sidewalks enhance safety and convenience for able-bodied transit users, and are vital for seniors, the disabled, parents pushing baby strollers, or residents pulling shopping carts. In order to facilitate access for all groups, sidewalks should incorporate the following design features:
  - curb cuts at all intersections;
  - tactile warning strips along the curb edge of walkways;
  - durable, non-slip, all weather sidewalk surfaces and finishes.

- **The street pattern should be designed to provide maximum convenience and direct access from residences and jobs to transit stops.** As shown below, sometimes even minor alterations to street layouts within subdivisions or the addition of pedestrian walkways can minimize both perceived and actual walking distances. As much as possible, walking routes to transit stops should be direct. Street patterns which require pedestrians to backtrack are not desirable. Implementing this objective does not necessarily preclude the use of crescents or cul-de-sacs for local residential streets.



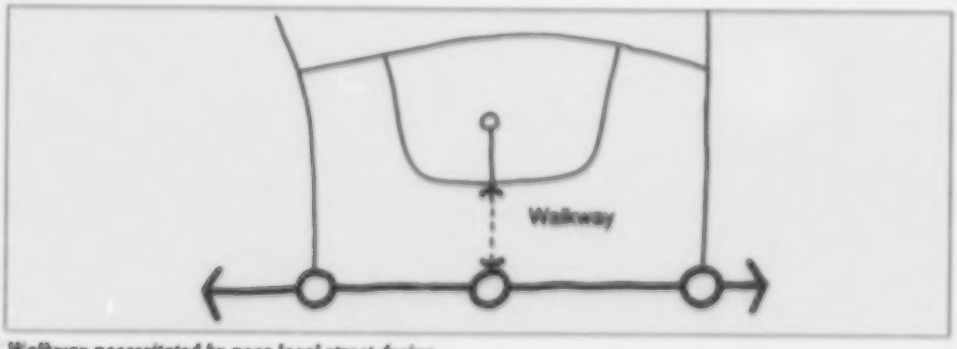
Layout provides longer, indirect pedestrian access to transit.



Layout provides shorter, direct pedestrian access to transit.

Adapted from: Guide to Transit Considerations, Transportation Association of Canada 1991

- **Provide pedestrian walkways when necessary.** Under most circumstances, good road layout and design can minimize walking distances and eliminate the need for mid-block pedestrian walkways. However, in some circumstances, mid-block pedestrian walkways may be required, to meet minimum walking distance criteria.
  - If walkways are provided then they should meet the following design standards:
    - they should be paved, and made of durable construction;
    - they should be maintained year-round;
    - they should be illuminated at night to enhance personal safety.



Walkway necessitated by poor local street design.

Adapted from: Guide to Transit Considerations Transportation Association of Canada 1991

Action:

- In addition to the information normally submitted as part of a draft plan of subdivision, municipalities may ask applicants to submit drawings showing contours of walking distances to transit stops in their proposed subdivisions. Such drawings should show proposed locations for bus stops and transit routes. Input from transit operators is important at this stage, and transit operators should consider developing a comprehensive transit plan to facilitate the implementation of this recommendation.
- Indicate transit routes in official plans and secondary plans. Major routes may be included as part of the plan, but for greater flexibility local routes, which may change from time to time, may be identified on a separate appendix to the plan.
- Properties adjacent to transit routes should be designated for higher density, street-oriented development where appropriate.
- In areas characterized by fragmented property ownership, each subdivision may not be able to meet the maximum walking distance criterion. Under these circumstances, the planning and transportation/works departments should achieve an area-wide road layout concept plan which meets the street/route/stop spacing criteria on an area-wide basis.
- Official plans, or subdivision guidelines adopted by the municipality, should state that a significant majority of residences, jobs or other activities/uses should be located within 400 m of a transit stop. Examples of possible implementation criteria which could be incorporated into official plans or subdivision guidelines include:
  - 90% of residences, jobs or other activities/uses should be located within 400 m walking distance of a transit stop, or;
  - 65% of residences, jobs or other activities/uses should be located within 200 m walking distance of a transit stop.
- The exact wording of such criteria would depend on the specific circumstances within each municipality.
- Subdivision agreements should detail the location and design of pedestrian walkways/sidewalks.

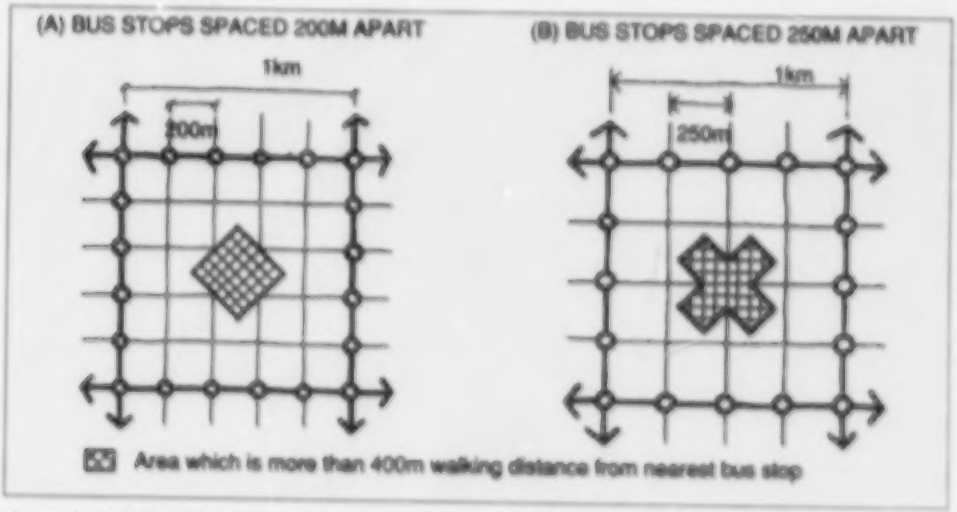
Guideline: 3.4.2

Bus Stops and Local Roads Should Generally Be Spaced 200 m to 250 m Apart, Along Transit Routes

Background:

The distance between bus stops is an important factor in determining how far pedestrians must walk to reach transit services.

- The shorter the distance between stops, the shorter the walking distance for transit users. However, there is a trade-off involved since shorter distances between bus stops will mean more frequent stops, slower average bus speeds, and longer travel times.
- If the goal is to design for a maximum 400 m walking distance (Guideline 3.4.1), and arterials and collectors are spaced a maximum of 1 km apart, then about 90% of the area within a 1 km block will be located within 400 m walking distance of a bus stop if stops are located 200m apart. If bus stops are 250 m apart, the area beyond the 400 m walking distance will be slightly larger. The area within the interior of the block which is located beyond the 400 m walking distance can be reserved for open space and recreation uses, or lower density residences on larger lots.


(A) BUS STOPS SPACED 200M APART
1km
200m
(B) BUS STOPS SPACED 250M APART
1km
250m
Area which is more than 400m walking distance from nearest bus stop

Approximately 90% of the area within a block is located within 400m walking distan.. of a transit stop.

It is also important to note that if spacing between arterial and collector roads increases, then shorter distances between bus stops will be required to maintain the walking distance criteria discussed above. Also, bus stop spacing in high density activity nodes will likely be less than 200m to 250m, due to high passenger volumes.

- **Intersections between local roads and transit routes should also be spaced 200 m to 250 m apart, or less, where feasible.** To maximize pedestrian access to transit stops, and minimize walking distances, bus stops should generally be located at points where local roads intersect with collectors and arterials. In most municipalities, this

will require significant changes to current standards relating to intersection spacing along arterial roads.

- If the location of bus stops and the intersections of local roads and transit corridors cannot be made to coincide, then pedestrian walkways to bus stops should be provided, to ensure that the quality of pedestrian access is preserved.
- Relatively short spacing of local road intersections along transit routes will have the added benefit of improving pedestrian access from internal residential areas (Guideline 3.3.4).

Action:

- When reviewing draft plan submissions, ensure that bus stops and intersections between local roads and arterial/collector roads are located at 200 m to 250 m intervals on average, or if bus stops are located at different intervals, that the maximum walking distance standards are maintained.

Guideline: 3.5.1

ORIENT USES TOWARD THE STREET IN ACTIVITY NODES AND CORRIDORS

Background:

Commercial arterials and collector roads which were built during the post war period are often designed for the convenience of auto users at the expense of pedestrians. The result is a sterile, inhospitable and potentially dangerous environment for pedestrians.

Auto-oriented development: buildings set back from the street, parking areas adjacent to street, limited pedestrian amenities.
Adapted from : Public Streets for Public Use, Portland's Arterial Street Classification, Dottemer, 1987

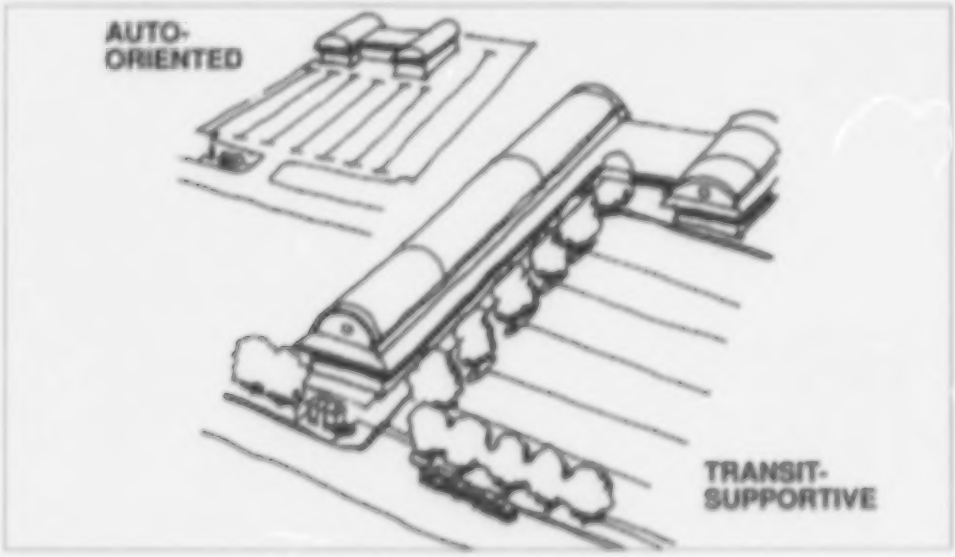
Transit-supportive development: Buildings and entrances adjacent to the street and parking in the rear, create a more attractive pedestrian environment.
Adapted from : Public Streets for Public Use, Portland's Arterial Street Classification, Dottemer, 1987

The following principles should be incorporated into the streetscape design of activity nodes and corridors, in order to create a more supportive environment for pedestrians and transit users:

- Buildings should be brought as close to the streetline as possible to improve pedestrian access to buildings, to improve streetscape aesthetics and to create a safer environment by providing opportunities for surveillance from surrounding buildings. The front of the building, or at least one main entrance, should be located at the streetline.
- Parking lots should be located in rear yards or side yards.
- Reduce mid-block curb cuts for entry/exit of vehicles to parking lots. Frequent vehicle entry/exit points create a dangerous environment for pedestrians, and contribute to congestion along the road.
- Avoid long stretches of walls, berms or fences along arterial roads. In particular, reverse lotting should be strictly avoided. In addition to creating a sterile environment,

reverse lotting makes subsequent redevelopment and intensification along arterials very difficult (Guideline 3.3.4).

- Retail plazas are a special case: Unlike office, industrial or residential buildings, retail plazas may need parking which is visible from the street for marketing reasons. Although the goal should be to encourage all uses to front directly onto transit routes, retailers may be reluctant to take this step when a sizeable proportion of their customers still arrive in their cars and parking areas which are visible from the street are considered an important marketing feature. However, Guideline 3.6.1 indicates how an auto-oriented retail centre may gradually evolve into a more transit-supportive design, as uses in the surrounding area intensify.



Provide direct connections to the sidewalk
Adapted from: Accommodating the Pedestrian, Richard Untermann (New York, 1987)

- Even in auto-oriented areas, plazas should still provide a direct connection to the sidewalk, to accommodate pedestrians and transit users.
- Larger plazas can add an office building to the corner, and/or provide a separate delivery entrance to the rear of the stores.

Action:

- Official plans should encourage uses located along transit routes in activity nodes and corridors to be street-oriented, and to provide direct pedestrian access to a public sidewalk.
- Zoning regulations applying to activity nodes and corridors should specify maximum building setback and prohibit parking in front of buildings, where appropriate.
- Building location can be determined during site plan review. Special attention should be paid to the location of buildings and building entrances in relation to the street when reviewing site plan applications. In addition, vehicular entrances and exits which cross sidewalks should be minimized to provide a safer pedestrian environment.

Guideline: 3.5.2

DEVELOP PEDESTRIAN-SUPPORTIVE AMENITIES ALONG STREETS IN ACTIVITY NODES AND CORRIDORS

Background:

If activity nodes and corridors are safe, attractive and interesting for pedestrians, walking, cycling, and travelling by transit will become more enjoyable and convenient. Steps which will help to create a more pedestrian-supportive streetscape include the following:

- **Locate retail stores, service shops and restaurants at grade:** This will help to animate the street and encourage additional pedestrian activity. Window displays, signs, interesting architectural details, and views from the sidewalk of indoor activities add colour and interest to the street. Frequent entrances into buildings increase the sense of safety for pedestrians, and provide additional opportunities for informal surveillance from these buildings.

Locate pedestrian-oriented uses at street level.

- **Provide amenities to improve the micro-climate along streets:** Amenities which help to protect pedestrians from wind, snow and excessive heat or sunlight will add to pedestrian comfort:
  - where appropriate, canopies or arcades can be provided along the street frontage of buildings. However, they should be carefully designed not to obstruct views and access between building entrances, the sidewalk and the street;
  - shade trees may be planted to provide additional climate protection, and contribute to an attractive pedestrian environment;
  - careful landscape and building design can improve wind patterns.

Provide canopies or arcades along buildings.
Adapted from: Guide to land Use and Public Transportation Snohomish County Transportation Authority.

- **Provide continuous sidewalks on both sides of the street:** To accommodate pedestrians and transit users, sidewalks should be continuous on both sides of the street. Where feasible, sidewalks should be sufficiently wide to accommodate bus shelters and waiting areas, street tree planters, through pedestrian traffic, and an area adjacent to buildings to allow for window shopping. To facilitate access for all groups, sidewalks along major transit routes should include curb cuts at all intersections, tactile warning strips along the curb edge of walkways, and a minimum of grade changes.

Provide wide sidewalks and shelters along major transit routes.
Adapted from: Streets For Pedestrians and Transit: An Evaluation of Three Transit Malls in The U.S., Crain & Associates DOT, UMTA 1979

- Provide frequent opportunities for pedestrians to cross the street safely: Arterial roads with few crossings will be less attractive and convenient for pedestrians, shoppers and transit users if the roads are wide and carry high traffic volumes. Crosswalks or signalized intersections should be located at frequent intervals, particularly at transit stops (Guideline 3.3.4).

Action:

- Official plans and zoning by-laws may contain policies governing the location and amount of at-grade commercial uses in activity nodes and corridors.
- Where feasible, designate sufficient road allowance widths along arterial and collector roads to permit sufficiently wide sidewalks to accommodate street furniture, bus shelters and other pedestrian amenities.
- When reviewing site plan applications, special attention should be paid to:
  - provision of canopies, arcades and/or landscape material to provide shade and weather protection;
  - other pedestrian issues such as distance and ease of access between transit stops and building entrances;
  - provision of pedestrian safety features, such as lighting and the quality of surface materials, along walkways providing pedestrian access into buildings.

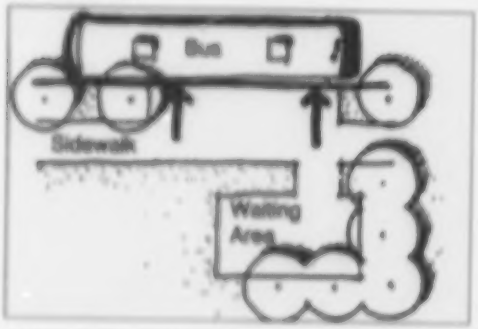
Guideline: 3.5.3

Design Transit Stop Waiting Areas and Shelters to Meet the Needs of All Transit User Groups

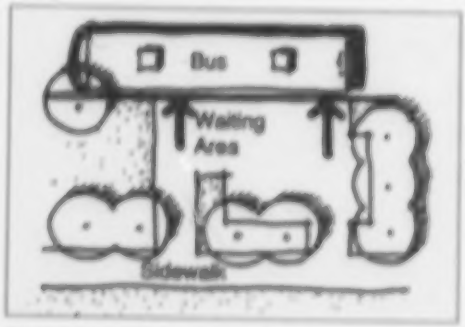
Background:

Transit waiting areas and shelters should be provided along well-travelled routes, and where transit serves a high proportion of travellers (such as at seniors' residences, hospitals, social services, social housing complexes). In particular, bus shelters and waiting areas are important for the elderly and the mobility-impaired. Transit users with strollers, buggies, bags of groceries also appreciate bus shelters.

In addition, bicycle storage facilities should be provided at transit stops. Commuting by bicycle is becoming more common. Bicycles might be used to travel between home and transit services if adequate bicycle storage facilities were provided at transit stops, rapid transit stations or commuter rail/intercity bus stations. In locating and designing bicycle storage facilities at transit stops, care should be taken to avoid pedestrian - bicycle conflicts.



Sidewalk adjacent to curb



Waiting area adjacent to curb.

Adapted from: Guide to Transit Considerations, Transportation Association of Canada 1991

The essential elements of passenger waiting areas and shelters include:

- **Connectivity.** Connections should be direct and convenient from the sidewalk to the shelter/waiting area, from the shelter/waiting area to the bus loading doors, and from the unloading doors to the shelter/waiting area. The diagrams illustrate two alternative layouts for waiting areas.
- **Safety**. Construction materials must be sturdy and weatherproof, and the layout must permit clear sight lines between waiting passengers and the drivers of cars and transit vehicles, as well as other pedestrians on the street (for informal surveillance). Night lighting is essential for visibility and personal safety. Landscaping can improve the environment around the shelter/waiting area but should not obstruct views into the shelter/waiting area from the sidewalk or from the road. Where feasible, two doorways should be provided in shelters for security. In addition, particular attention should be paid to the needs of the elderly and the visually and mobility impaired: shelters and waiting areas should be surfaced in non-slip, level, well-drained material; changes in levels should be avoided; pedestrian and circulation areas should be kept free of obstructions; shelters should have transparent sides for visibility and security; seating should be fixed and should include armrests to assist individuals in lowering or raising themselves; tactile warning strips should be provided along walkways or shelter areas adjacent to streets, to help the visually-impaired.

- **Identifiability.** Waiting areas can be an important trademark of a transit system. If they are clearly identified, attractive and well-maintained, they can act as an inducement to riders to use the transit system.

Action:

- Transit shelters/waiting areas can be incorporated into the entry design of buildings, provided that buildings are located adjacent to the street and a transit stop is located in front of the building.
- Municipalities can use site plan controls to co-ordinate building entry design with public access routes, bus stop locations and shelter designs. The personal safety and comfort of transit users should be given special consideration during site plan review.
- Under most circumstances, the municipality or transit operators will be responsible for the provision of shelters/waiting areas. Many municipalities and transit systems have also entered into agreements with advertising companies to obtain shelters at no cost in return for the right to display advertising on the shelters.

Transit shelter layout in urban area.
Adapted from: Transit-Related Community Planning Issues. (A Report to the IACTS Implementation Committee), Ontario Urban Transit Association, 1989

- Bicycle riders should be provided with sheltered and secure bicycle storage facilities at major transit stops and rapid transit and commuter rail stations.
- Where feasible, bicycle routes should be designed to provide direct access to transit routes, transit stops and rapid transit stations.

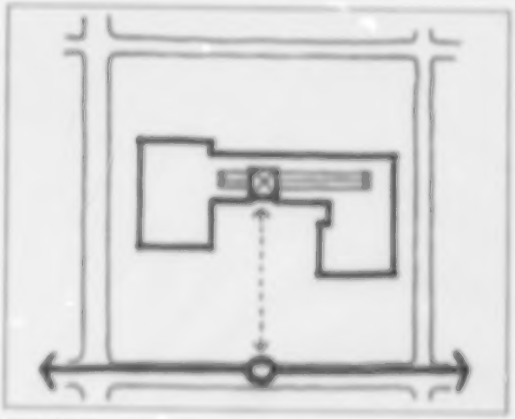
Guideline 3.6.1

Design Large Shopping Centres to Facilitate Pedestrian Access and Future Intensification

Background:

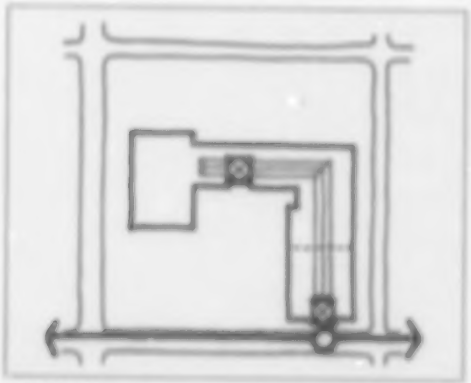
In a transit-supportive environment, major shopping centres should be developed in conjunction with a mix of higher density uses (Guideline 2.4.1). Large shopping centres should be designed to have good pedestrian access, and infill development should be relatively easy to accommodate as the surrounding activity node intensifies.

- **Typical shopping centre layouts are not transit or pedestrian-friendly:** Most large shopping centres are set far back from surrounding arterial roads and are surrounded by large parking lots:
  - Walking distances between the shopping centre and surrounding buildings and/or transit routes are long.
  - Pedestrians have to walk through a large, potentially dangerous parking lot to reach the shopping centre, which discourages pedestrians and transit users. Alternatively transit vehicles must take circuitous routes to provide direct access to shopping centre entrances, potentially increasing travelling time for transit vehicles.

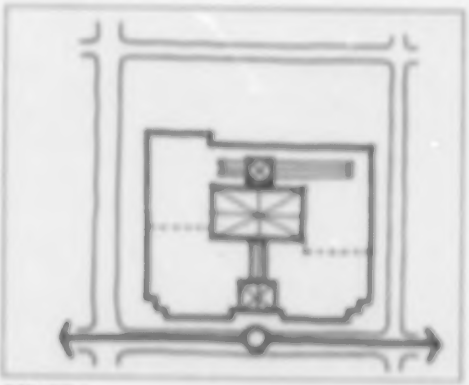


PHASE 1
Conventional shopping centre as first built.

- **Locate one building face or the main entrance adjacent to an arterial road:** In order to avoid these problems, large shopping centres should be redesigned so that at least one main entrance fronts directly onto a transit route.
  - Direct pedestrian access from an arterial road will reduce walking distances for pedestrians and transit users. Transit vehicles will be able to provide direct access to main entrances without having to detour through a parking lot.



PHASE 2
Entrance fronting on transit route.



PHASE 3
Intensification along transit route.

- This layout will facilitate future intensification. Once the main entrance of the shopping mall is established adjacent to the transit route, additional development can be located along the transit route frontage of the property, without blocking access to the shopping mall.

Action:

- Official plans should establish the basic goal that at least one major entrance to a shopping centre should be located adjacent to the street, wherever feasible.
- The location of entrances, buildings, and parking areas can be determined during site plan review. When reviewing site plans, special attention should be given to the relationship between building entrances and the street.
- In zoning bylaws, the minimum parking provisions for large shopping centres and office buildings should be reduced to facilitate intensification, in areas that are well served by transit.

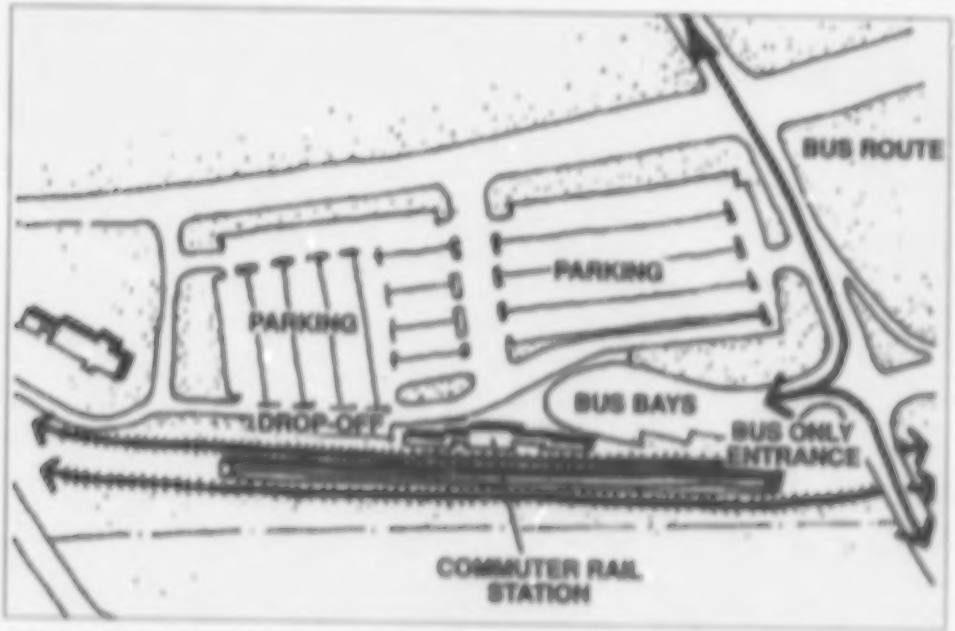
Guideline: 3.6.2

Transfer Nodes Should Evolve as the Urban Area Grows

Background:

Transfer nodes are major transportation terminals and inter-modal transfer points which act as focal points in a transportation network, and are designed to attract people to and distribute them from transit facilities. They usually encompass a station on a major transit facility (such as commuter rail or rapid transit lines) and/or a local/regional/intercity bus terminal, and can also include commuter parking facilities, kiss 'n ride areas, bicycle storage, and on-site services and development.

Transfer nodes may be located near the fringe of a large urban area, at the edge of the main built up central area, or at transit stations located within smaller urban areas on the periphery of a larger urban area.

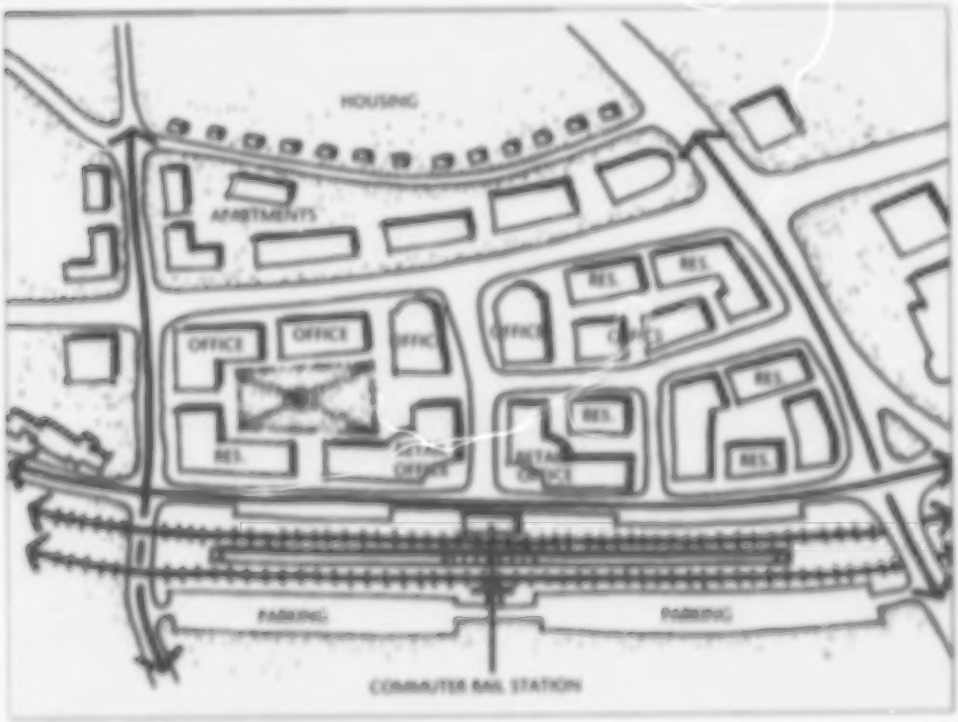


Initially, a suburban transfer node may employ park-and-ride, with little development.

While transfer nodes can be viewed as an effective means of getting existing auto commuters, living in low density residential areas, out of their cars before they enter the congested urban area, they can also contribute to additional urban sprawl. As roads become more congested, journey times get longer and parking rates increase, there will be an increased desire by commuters to use transit, particularly rail transit, to access the central city. If the only means of getting to the transit station is to live nearby and walk in, or to take local transit, then most people will live at densities which can support transit. If, however, convenient and cheap parking is available immediately adjacent to the station, many people will take what they see to be the best of both worlds: a large lot, estate-type, and car-oriented residence; an auto-oriented leisure and shopping life style; and a convenient rail-oriented work trip to avoid the congestion of the central area.

The extension of a transit system to a greenfields location, along with a large parking lot, can encourage and sustain a large low density residential area for many years before redevelopment and intensification begin to take place. Accordingly, the preferred location for a transfer node is in an already partly developed area, or one which is about to undergo development or redevelopment. In this situation, the transfer node, associated road links, and the presence of a local transit network focused on the transfer node can help to encourage intensification and redevelopment.

From the beginning, such a transfer node should be planned with the intent that it will evolve from an early emphasis on automobile/transit transfers to subsequent emphasis on transit/transit transfers (e.g. between local and regional transit) as urban intensification occurs in its immediate vicinity and catchment area. The planning should include both land use and transportation aspects and incentives in order to achieve the mutually reinforcing ends of compact, mixed-use urban form and convenient, efficient transit to serve and help shape it.



As the transfer node evolves, compact mixed-use development occurs and transit connections dominate, in accordance with flexible initial planning to achieve this.

There are several advantages to encouraging a mix of uses, such as residential, employment, retail, other commercial uses and social services, at transfer nodes.

Residential uses will help create a market for transit services, encourage a more efficient use of transit services, and give the node an identity beyond the purely mechanical function of transferring travellers between modes.

Providing employment uses will encourage reverse commuting from other parts of the urban area to the transfer nodes. This will help to ensure that transit services will carry passengers in both directions, rather than in only one direction, resulting in more efficient use of transit infrastructure. Also, the additional demand will permit increased local transit service levels.

Retail and other commercial uses at transfer nodes will generate traffic throughout the day rather than at peak periods only, allowing for more consistent levels of transit service during off-peak hours. They will also help to make the mode change more convenient for commuters, allowing them the opportunity to shop, run errands, etc. at the transfer node when they transfer between transit and their cars.

Social service activities, such as day care, will encourage use of the transfer node to change mode. In addition, the presence of high-quality transit service will assist transit-dependent clients in accessing other social service activities.

Bicycle facilities can also be considered at transfer nodes as a means of facilitating inter-modal trips and enlarging the transit catchment area to non-motorized means of transportation.

Action:

- Transfer nodes should be located in areas which have the potential to develop as high density, mixed-use nodes.
- Transfer nodes which involve transfers from automobile to transit should in general be located at the edge of built up areas to intercept existing auto commuters and transfer them to transit for the journey to their destination.
- Such transfer nodes, however should not be designed or located to facilitate and encourage significant further development of low-density, auto-dependent residential areas. Rather, they should be planned to evolve into transit/transit transfer facilities and to encourage more compact, mixed-use urbanization in the surrounding catchment area.
- Transfer nodes should be designed to give priority to transit vehicles over private automobiles. For example, feeder buses should be provided with queue-jump or bus only lanes or entrances to bypass cars waiting to access parking lots or passenger areas.
- Over time, residential, employment and other transit-supportive land uses should be encouraged to develop immediately adjacent to the transit station and along the corridors used by local feeder buses. Such development should be designed to replace and reduce the parking supply at the node and to increase transit usage.
- In the official plan or secondary plan, define transfer nodes as mixed-use areas.
- Ensure that zoning by-laws permit a range of compatible uses at the site.
- Encourage the private sector to locate/develop at or near transfer nodes.

PROCESS/INCENTIVES

CHAPTER 4

PROCESS-RELATED ISSUES

The guidelines identified in the previous two chapters address the physical changes in the urban structure (mix of uses, densities), and the physical design of transit routes, streetscapes and specialized uses which will help to create a more transit-supportive urban environment. However, more than physical changes in urban structure and design are necessary. This chapter addresses the role that transit agencies, the planning process and various market and non-market incentives can play in developing a more transit-supportive urban environment.

Guidelines in this chapter include a discussion of the role that transit agencies should play in developing municipal planning documents and in reviewing official plan and zoning amendments, draft subdivision plans and site plan submissions.

This chapter also addresses the transit-related planning policies, regulations and issues which should be addressed at each of the major stages in the planning process including preparation of official plans and secondary plans, development of zoning by-laws, and review of subdivision and site plan submissions.

A number of transit priority measures are also discussed. These measures include: providing high occupancy vehicle (HOV) lanes along congested transit routes; providing traffic preemption systems and queue-jump lanes; establishing stopping, turning and parking restrictions along transit routes; and, in special circumstances, developing transit malls.

As well, a number of market-oriented incentives are also discussed, such as: reducing parking requirements in areas that are well served by transit; raising parking fees in downtown municipal lots, (to act as a disincentive to auto use, particularly in peak periods); offering innovative transit fares and discounts to specific target groups; and integrating transit fares and co-ordinating service between different transit systems and modes (to facilitate inter-municipal transit travel in larger urban areas).

Guideline: 4.2.1

Transit Agencies Must be Actively Involved in all Stages of the Planning Process

Background:

Effective planning for transit-supportive land uses requires a comprehensive approach, which co-ordinates the land use policies in municipal planning documents with the needs of transit agencies, and allows transit agencies to provide input into all stages of the planning and development review process.

- Municipal planning documents establish the framework for a transit-supportive urban structure, by establishing future development densities, spatial organization and mix of land uses, locations of arterial and collector roads, and detailed land use regulations. Transit agencies should play an integral role in the development and review of these policies.
- Transit agencies should also play an active role in reviewing site specific amendments to official plans and zoning by-laws, draft plan of subdivision applications, and site plan applications, to determine the extent to which the needs of the transit system are being addressed.
- Transit agencies should be involved in negotiations with developers, when changes to development applications are being considered.
- Transit agencies should work towards making other municipal departments (and provincial agencies) aware of their needs and requirements.

Actions:

Transit agencies should play a comprehensive and active role in establishing land use policy and resolving issues in the following areas:

Official Plan and Secondary Plans:

Transit agencies should participate in:

- Identification of the role and objectives for transit service within the community.
- Identification of transit needs regarding arterial and collector road layout and spacing, local street layout, densities and mix of uses along transit routes.
- Development of policies relating to the phasing and timing of future urban development.
- Identification of future transit routes, transit nodes, co-ordination of future activity nodes with transit nodes.
- Identification of intermodal transfer nodes.
- Review of draft official plan and secondary plan amendments.
- Developing modal split targets.
- Developing transit service standards, to indicate conditions which should be met prior to extending transit routes.

- Identification of overall urban densities required to support desired levels of transit service.
- Identification of development densities required at various activity nodes and corridors in the urban area.
- Review of proposed densities and mix of uses in development applications to ensure that they are appropriate for projected levels of transit service.

Zoning By-laws:

- Review of draft by-laws to ensure that regulations regarding lot frontages, densities and permitted uses along transit routes will support the service and financial objectives of the transit agency.

Subdivisions:

- Assessment of local road layouts, arterial/collector road layouts, analysis of the costs and feasibility of servicing the proposed development (e.g. route length per number of residents served), review of walking distances to transit stops, location of transit stops, proposed staging of development with respect to planned expansion of transit services, review of cost/benefits of providing transit services if development is located away from the current transit service area.

Site Plans:

- Review of the orientation of buildings to streets along transit routes, pedestrian access/walking distances from transit stops to building entrances, location of entrances in relation to streets and transit stops.

In both subdivision and site plan applications, transit agencies should be given the opportunity to recommend changes to initial development proposals. Where major changes to an application are requested by the transit agency, the agency should play a direct role in consultation and negotiation with developers. Transit agencies should also be given the opportunity to review revised plans to verify the changes that have been made.

It is important to note that there is growing concern about the complexity, length of time, and costs involved in the review of development applications. Input from transit operators is important during the review process, to ensure that the approved development is as transit-supportive as possible. However, input from transit operators should occur within the context of streamlining the process and reducing unnecessary delays. Efficiency and properly managed systems for incorporating transit concerns should be given priority within the review process.

Guideline: 4.3.1

DEVELOP THE POLICY FRAMEWORK FOR A TRANSIT-SUPPORTIVE URBAN STRUCTURE IN OFFICIAL PLANS AND SECONDARY PLANS

Background:

Official plans and secondary plans provide the overall basis and context for all subsequent stages in the land use planning process. It is therefore essential for land use policy documents to provide guidance on the major issues discussed in previous guidelines.

Action:

- **Municipal land use policy documents should include general policy statements which address the following issues:**
  - The municipality's rationale for and commitment to incorporate transit and transit user needs into the planning process;
  - The establishment of a development review process (covering amendments to land use policy and regulatory documents, subdivision and site plans) which formally gives the transit agency an opportunity to comment on proposed plans and request changes to them, and to participate in the consolidation and enforcement of the final changes recommended by the municipal planning department;
  - A general statement about the role that transit is seen to play in the community.
- **Municipal land use policy documents should also establish goals and objectives and specific policies on the following transit-related issues:**
  - The establishment of ultimate and interim urban boundaries, to reduce urban sprawl, and encourage compact urban development (Guideline 2.2.1);
  - The establishment of target development densities for employment and residential uses within urban areas which will be sufficiently high to support desired levels of transit service (Guideline 2.2.3);
  - The incorporation of a full range of housing types and land uses within the urban area to reduce the need for inter-urban commuting;
  - The designation of one or more mixed-use, high density "activity nodes" in the urban area, which should be located at major intersection points in the transit system (Guidelines 2.3.1 and 2.3.3);
  - The designation of major transit routes as medium density, mixed-use "activity corridors"(Guideline 2.3.2);
  - The designation of a comprehensive network of arterial roads, collector roads and major transit routes in policy documents (Guideline 3.3.2);
  - Location of land uses frequented by transit-dependents or mobility-impaired people should be located adjacent to transit stops (Guideline 2.4.2);

- The adequate spacing of arterial and collector roads to accommodate needs of transit operators (1 km apart maximum)(Guideline 3.3.2);
- A policy indicating that a significant majority of residences, jobs and other activities/uses should be located within 400 m walking distance of a transit stop (Guideline 3.4.1). Examples of possible wording include:
  - 90% of residences, jobs and other activities/uses should be located within 400m (actual walking distance) of a transit stop; and/or
  - 65% of residences residences, jobs and other activities/uses should be within 200m (actual walking distance) of a transit stop;
  - Alternatively, these criteria could be addressed in the municipality's subdivision guidelines;
- **additional policies for transit-supportive subdivision design include:**
  - collector/arterial roads should be designed to be as straight and direct as possible to prevent circuitous transit routes (Guideline 3.3.1);
  - local road patterns should provide direct pedestrian access to transit stops and transfer nodes (Guidelines 3.2.1 and 3.4.1);
  - applicants should document proposed locations of bus routes and stops (Guideline 3.4.1);
  - applicants should document walking distances as part of the background information accompanying draft plan of subdivision submissions (Guideline 3.4.1);
  - reverse lotting adjacent to arterial/collector roads should be discouraged (Guideline 3.3.4);
- **general criteria for pedestrian supportive streetscape design in activity nodes and corridors should include the following (Guidelines 3.5.1 to 3.5.3):**
  - buildings should be oriented to the street and to transit services (to minimize walking distances);
  - parking areas should be located in side or rear yards wherever feasible;
  - retail and pedestrian-oriented commercial uses should be developed at street level;
  - pedestrian amenities such as canopies, arcades or landscaping for weather protection should be incorporated into the design of buildings located along major transit routes;
  - minimize barriers to pedestrian access
  - policy documents should establish the basic principle that at least one major entrance to a major shopping centre building (or other large buildings in the shopping centre complex) should be located adjacent to the street;
  - where appropriate, transit waiting areas should be incorporated into the design of major buildings located adjacent to transit stops.
- Official plan policies should also include a commitment to consult with groups representing women, the elderly, and the ambulatory disabled, when proposed official plan and zoning amendments are being considered, to determine if proposed amendments will have any impact on the safety concerns of these groups or their access to transit services.
- Municipalities may also consider adopting transit service standards in their official plans. These standards would determine, for example, the conditions which should be met before a new route extension is considered.

Guideline: 4.3.2

Develop Zoning By-law Regulations Which Will Encourage More Transit- and Pedestrian-Supportive Development Patterns

Background:

Zoning by-laws govern the location, density, height, coverage, and placement of buildings, as well as other facilities such as parking and loading areas. The policies and goals of municipal official plans are implemented through zoning by-laws (as well as other documents).

Action:

Zoning regulations which could help to implement the policy issues discussed in Guideline 4.3.1 include:

- reduce minimum lot sizes, and reduce lot frontage requirements, to increase development densities (Guideline 2.2.3);
- increase maximum (and/or establish minimum) gross floor area (GFA) and floor space index (FSI) standards along transit routes, and at activity nodes (Guidelines 2.3.1 and 2.3.2);
- permit a wide range of multi-family residential, commercial, retail, entertainment, community facility, recreational, and light industrial uses at designated activity nodes and along designated activity corridors; permit pedestrian-oriented uses such as retail, restaurants, and entertainment facilities at grade (Guidelines 2.3.2. and 3.5.2);
- avoid large areas zoned for a single use and density; generally, allow a greater mix of uses (where appropriate) within each zone (Guideline 2.2.4);
- allow a mix of housing types and densities in residential areas (Guidelines 2.2.3 and 2.2.4);
- permit and encourage facilities (such as educational institutions, senior citizen's housing, places of worship, social services, medical facilities), which are likely to attract a large percentage of transit-dependent people, to locate adjacent to transit stops and to be oriented toward those stops. Similarly, facilities such as large shopping plazas, employment facilities, and recreation facilities which generate a large number of trips should also be located adjacent to transit stops (Guideline 2.4.2);
- where appropriate reduce or eliminate required setbacks for commercial buildings and employment centres located along transit routes, and require parking facilities to be located in side or rear yards for most land use categories. The objective is to minimize walking distances and to maximize convenience for pedestrians walking between transit stops and building entrances (Guidelines 3.2.1, 3.2.4 and 3.5.1);
- reduce or eliminate minimum parking requirements in all zones; establish maximum parking requirements. Generally, parking requirements should be minimized in transit-oriented areas such as activity nodes and corridors, in order to encourage transit use (Guideline 4.5.1). Also, permit shared parking between different sites.

- Ensure that standards relating to off-street loading facilities are adequate, to minimize on-street conflicts between buses and trucks.
- When reviewing applications to amend existing zoning regulations or a redevelopment application consider the following transit-related issues:
  - the proposal should be at sufficiently high density to support a high level of transit service;
  - the proposal should conform to the mix of uses foreseen for the site or neighbourhood in the official plan or secondary plan;
  - buildings located along activity corridors and at activity nodes should generally be located at, or close to, the street line, and parking areas should be located in side or rear yards if feasible;
  - parking spaces should be minimized in areas well served by transit.

Guideline: 4.3.3

WHEN REVIEWING DRAFT PLANS OF SUBDIVISION, ENSURE THAT THEY ARE DESIGNED IN A TRANSIT-SUPPORTIVE MANNER

Background:

Subdivision plans play a crucial role in urban design, since they are the primary tools for creating local road patterns, lot patterns, and in newly developing areas, the pattern and design of arterial and collector roads.

Action:

The following transit-related issues should be considered when reviewing draft plans of subdivision:

- **Layout of local roads.** Do they provide direct walking routes to arterial and collector roads from all properties, or are there instances where residents will have to backtrack and walk a longer, more indirect route to reach transit facilities? Can road patterns be redesigned to eliminate these situations? (Guideline 3.4.1).
- **Walking distances.** Are most properties located within 400m (actual walking distance) of a transit stop? Official Plans or subdivision guidelines should set out specific criteria in this regard, to aid in reviewing subdivisions.
- **Uses along arterial and collector roads.** Reverse lotting along arterial and collector roads is a common design solution for residential subdivisions. However, it is not transit-supportive since it creates an inhospitable and unattractive environment for pedestrians along arterials and collectors, and does not provide for more intensive uses adjacent to transit routes. It also makes future intensification along transit routes difficult. Reverse lotting should be avoided under most circumstances. Properties adjacent to arterials and collectors should be sufficiently deep to accommodate future intensification, and should front directly onto these roads or in some cases, local service roads located immediately adjacent to the arterial or collector. (Guidelines 3.3.4 and 3.5.1).
- **Access between transit corridors and internal areas of subdivisions.** Bus stops should generally be located every 200m to 250m on average along transit routes. To facilitate pedestrian access, bus stops should be located where local roads intersect the transit route. Where this is not possible pedestrian walkways into subdivisions should be provided at bus stop locations. Bus stop locations and transit routes should be shown on accompanying documentation. (Guideline 3.4.1).
- **Continuous collector roads.** It is also important that neighbouring subdivisions be linked together by continuous collector roads, and that there are provisions to make it possible to continue a collector road on an abutting property if that property is still vacant. Designating collector and arterial roads in land use policy documents will be useful in this regard. (Guideline 3.3.1).
- **Location of sidewalks.** Sidewalks should be located along both sides of each road serving as a transit route. Ideally, sidewalks should also be built along at least one side of each local street which provides direct access to a transit route (Guideline 3.4.1).

- Streetscape and transit user amenities such as improved sidewalk design for the mobility-impaired, and street trees and other landscape elements for wind and sun protection, should be provided for, through detailed clauses in subdivision agreements.
- Other transit-related clauses which may be included in subdivision agreements include:
  - identification of streets to be used as transit routes (however this should be carefully worded to permit minor adjustments in the future);
  - design standards (width, geometry, construction materials) for roads intended as transit routes (Guideline 3.3.3);
  - location and design of sidewalks (Guidelines 3.4.1 and 3.5.2);
  - location and design of pedestrian walkways (Guideline 3.4.1);
  - a guarantee that potential bus stops and shelters will be shown on subdivision plans posted in sales offices, and that future bus stop locations will be posted in the subdivision at the earliest possible time;
  - specified staging and progression of various roads and phases of the subdivision, and identified locations of temporary bus turnarounds.

Guideline: 4.3.4

Ensure That Site Plan Submissions Incorporate the Needs of Pedestrians and Transit Users

Background:

Site plan review is an important tool in transit-supportive land use planning since it can be used to determine: the location of parking lots and driveway access; the massing and conceptual design of proposed buildings; the relationship of the proposed building to adjacent buildings, streets and exterior areas to which members of the public have access; exterior lighting; and the location and surface treatment of pedestrian walkways. These design elements are directly related to many of the transit-supportive site plan and streetscape design issues discussed in previous guidelines.

Action:

The following transit-related issues should be considered when reviewing site plans for properties located along transit routes (Guidelines 3.5.1 to 3.5.3, and 3.6.1):

- **Provide direct pedestrian access to the building from the street.** Buildings should provide direct, uninterrupted pedestrian access from the public sidewalk to the main building entrance. Shopping centres should provide at least one major entrance with direct pedestrian access from the street (Guideline 3.5.1).
- **Buildings should be located as close as possible to the streetline,** to create a more protected environment for pedestrians and facilitate pedestrian access to and from buildings. Avoid blank walls, berms, or fences adjacent to the streetline.
- **Parking areas should be located in rear and side yards, not in the front yard.** However, this criterion may not always be feasible for shopping centres which rely on automobile traffic. In this case, at least one major entrance should be located adjacent to the street.
- **Site designs should *minimize* the number of mid-block entry and exit points for vehicles,** since these reduce sidewalk amenity and safety for pedestrians.
- **Where buildings are set back from the street, pedestrian walkways should provide a direct route between sidewalks and building entrances, and grade changes and stairs should be avoided if possible.** On-site lighting should be designed to maximize pedestrian safety, all pedestrian walkway surfaces should be covered in durable, non-slip surfaces. Walkway edges should be clearly defined with tactile warning strips, as should any stairs or ramps, to aid the visually-impaired.
- ***Pedestrian amenities should be provided for weather protection.*** Where appropriate, amenities such as canopies or arcades along walkways and public sidewalks and/or boulevard shade trees and other landscape elements along the street frontage of proposed developments should be provided to improve pedestrian comfort.
- **Sidewalk improvements, transit shelters and waiting areas are desirable.** Where required, municipalities may request sidewalk improvements along the street frontage of proposed developments. In addition, large scale developments which warrant a transit stop in front of the property may be required to provide a transit shelter or waiting area, either in front of the building, or as part of the building design.

As a condition of site plan approval, developments along transit routes should be required to display municipal street addresses prominently so that they are clearly visible from a bus or streetcar.

Guideline: 4.4.1

Provide High-Occupancy Vehicle (HOV) Lanes

Background:

An effective way of improving the attractiveness of transit is to improve its travel time and reliability relative to the auto. One way to do this is to provide transit vehicles with exclusive or nearly-exclusive lanes on city streets. This exclusivity may also be extended to private vehicles carrying three or more occupants, and to taxis. These vehicles are commonly referred to as high-occupancy vehicles (HOV's).

In urban areas, HOV lanes can be created by demarcating curb lanes through special signing and painting, when an arterial road is being widened and additional lanes are being added.

HOV/Transit lanes in the curb lane.

Existing lanes can be designated as HOV lanes. However, there must be strong political will to do this, and a strong case that this will actually result in a shift from auto to transit.

Where the road right-of-way is wide enough, municipalities may consider HOV lanes in a median strip.

In the case of HOV lanes which are not physically separated from mixed-use lanes, the HOV designation can be full-time, or limited to peak periods during weekdays.

In situations where peak traffic is highly directional, the median lane in the under-used off peak direction can be reversed and designated as an HOV contraflow lane using special pavement markers.

Any efforts to establish HOV lanes would require detailed feasibility studies.

Actions:

- When protecting right-of-way for future arterials, consider the eventuality of incorporating transit/HOV lanes.
- Modify existing municipal arterial design standards to include HOV lane provisions.
- Identify streets where transit vehicles are routinely delayed by congestion, and consider applying HOV lanes on these routes.

Guideline: 4.4.3

Provide Transit Priority Through Traffic Signal Pre-emption Systems

Background:

A way to reduce delays incurred by transit vehicles at intersections, thereby improving their performance and attractiveness, is to implement a traffic signal control scheme whereby the presence of a transit vehicle triggers a signal to turn green in that direction.

The technology for achieving this is relatively straightforward. If the transit vehicle is travelling on an exclusive facility, a simple presence detector in the pavement can be used to trigger this signal. If the vehicle is travelling in mixed traffic, the vehicle is required to send some form of transmission (e.g. a microwave pulse) to the traffic control signal.

Action:

- Identify intersections where transit vehicles routinely are delayed due to heavy traffic or the need to make awkward manoeuvres (e.g. left turns against heavy opposing traffic).
- Consider adapting municipal traffic signals so that they are responsive to transit vehicles.

Lights turn green when bus is ready to cross the intersection, in response to remote activation from bus.

Guideline: 4.4.1

Provide Queue-Jump Lanes for Transit Vehicles

Background:

A smaller-scale, but still effective, version of the HOV concept (Guideline 4.4.1) is to provide lanes for buses to by-pass queues at intersections. These lanes are similar to HOV lanes, but typically extend for less than one block.

Often, queue-jump lanes can be provided with minimal changes to an intersection. For example, a right turn lane can be converted by providing some simple signing (e.g. "right turn lane - buses excepted"), reducing the size of the right-turn island if one exists, and providing a small bay on the far side of the signal to allow buses to reenter the traffic stream.

This measure is particularly effective if it is combined with some form of signal preemption scheme (Guideline 4.4.2).

A right turn lane converted to a transit queue jump lane.
Adapted from: Transit Priority Update, TTC, April 1992

As described in guideline 3.1.4, any plans to modify an arterial intersection should recognize the needs of pedestrians; a queue jump lane will be less effective if it makes crossing the street more difficult.

Actions:

- Identify arterial intersections where transit vehicles are routinely delayed, and which are physically amenable to queue jump lane treatment.
- Consider adding queue jump lanes at these intersections.

Guideline: 4.4.4

ESTABLISH OR EXPAND STOPPING, TURNING AND PARKING RESTRICTIONS

Background:

Stopped, parked or right-turning vehicles often interfere with smooth and reliable transit operation. Municipalities can enact or reinforce by-laws to restrict such actions, particularly during peak periods.

Such restrictions are doubly effective, since they both improve transit performance and decrease the attractiveness of using automobiles for local trips. However, they also make through-trips by automobile more convenient. Consequently, they should be proposed only for roads which carry a significant volume of transit vehicles.

In some heavily congested areas, a total ban of on-street parking could be considered. This proposal usually meets with significant opposition from local merchants and may encourage shoppers to travel to auto-oriented malls if parking becomes severely restricted. Replacing some or all of the lost parking with off-street parking is one way of mitigating the impacts on local business. Reducing on street parking will not be as disruptive to merchants if transit service provides an attractive alternative to private automobiles. Also, the provincial government published a set of technical guidelines and a model parking by-law for disabled persons in 1990. Among other things, these guidelines recommend that disabled persons holding special parking permits should be permitted to park in zones designated as "no parking" areas on the street. A total ban on on-street parking could seriously impact these programs, if not carefully implemented.

Action:

- Review current restrictions on stopping, turning, or parking (if any) with a view to strengthening them in the interest of improved transit.

Guideline: 4.4.5

CREATE TRANSIT MALLS

Background:

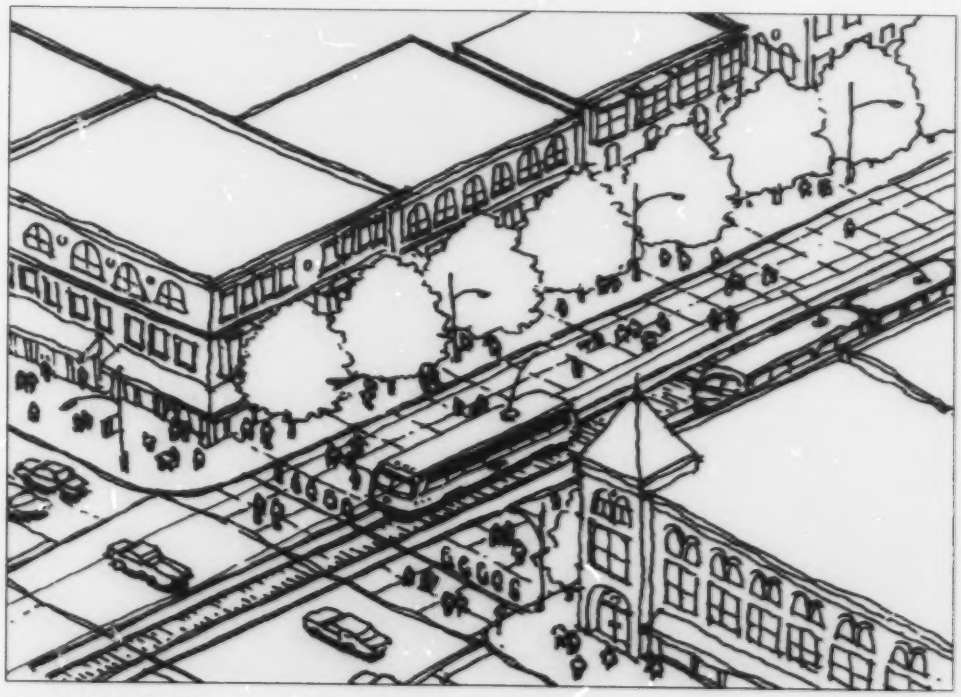
In highly congested areas such as city/town centres and major activity nodes, certain blocks may be designated as transit malls. These are areas where transit vehicles are the exclusive, or at least the dominant, form of transportation in association with walking and possibly bicycling.

The basic transit mall can take many forms including:

- restricting entry to an area during peak periods to transit vehicles, delivery vehicles and private autos bearing a sticker proving they have a reserved parking space in the area;
- charging a fee for private entry into an area (Guideline 4.6.3);
- the outright banning of automobiles during certain periods or at all times.

Action:

- Review sites in the downtown area with significant concentrations of automobiles, transit, bicycles and pedestrian movements with a view to converting them into transit malls. The proposed area should also be located along a major transit route, or at a point where several transit routes intersect.



A typical transit mall.

PLANNING SCALE: Area Municipal/District/Neighbourhood/Site URBAN SIZE: All

Guideline: 4.5.1

REDUCE PARKING REQUIREMENTS

Background:

The availability of parking has an adverse effect on the attractiveness of transit. Ample parking makes it convenient for automobile owners to use their cars. Further, large parking areas are difficult to traverse on foot (Guidelines 3.5.1 and 3.6.1) and tend to make sites unfriendly to pedestrians and transit users, reinforcing the need to drive.

In areas well-served by transit, maximum parking requirements should be reduced or established in the zoning by-law if not already in place, while minimum requirements should be reduced or eliminated.

Maximum and minimum parking requirements may be reduced universally. Alternatively, reductions in requirements may be tied to the availability of transit-related features and other measures which support non-auto travel (e.g. proximity to transit stops/stations, provision of HOV-preferred parking, bicycle facilities and subsidized transit passes for building occupants.)

Strict parking restrictions must be accompanied by the availability of good transit service. In the absence of good service, parking restrictions are likely to backfire: existing businesses or proposed development may divert to other locations which are less desirable from a land use/transportation perspective, businesses may be rendered uncompetitive compared to other locations which offer free parking, and/or excess parking may simply spill over onto nearby streets.

However, in the presence of good transit service, parking restrictions are an excellent way of reinforcing transit demand.

Action:

- Review parking standards in areas with good transit service.
- Develop a system whereby developers can "exchange" parking spaces for transit/pedestrian/bicycle amenities.

Guideline: 4.5.2

RAISE PARKING FEES AND ELIMINATE "FREE" PARKING

Background:

Free or subsidized parking encourages auto use rather than transit. In fact, since there is no such thing as "free" parking, a counter-productive situation often exists, where transit users actually subsidize drivers. For example, in retail malls which provide "free" parking, the cost of providing that parking is reflected in higher prices, which are experienced by both auto and transit users.

Pricing approaches can take a number of forms:

- across-the-board increases in parking rates;
- preferential parking rates for short-term parkers with higher rates for all-day parkers (to discourage auto commuters);
- preferential parking rates for high-occupancy vehicles;
- parking surtaxes;
- alternative transportation fringe benefits from employers (i.e. instead of providing free parking) such as free or subsidized transit passes.

The basic premise is that the vehicle driver (not the employer and not the retailer) should bear the cost of parking directly.

However, parking fees should be designed so that they do not restrict convenient parking opportunities for disabled persons.

Action:

- Review pricing policies at municipally-owned parking lots to ensure that they are not inadvertently encouraging long-term (commuter) parking and discouraging transit use.
- Explore taxation and other mechanisms for increasing the cost of parking at private lots, in locations where convenient transit service exists.

Guideline: 4.6.1

APPLY INNOVATIVE TRANSIT FARES

Background:

One of the biggest determinants of mode choice is the out-of-pocket cost incurred by the traveller. Innovative fare programs attempt to increase ridership by providing discounts to specific target groups, aimed at encouraging them to use transit.

The fare structure and target groups for such a program depend on the specific ridership/mode shift objectives being sought.

To increase the use of transit during non-peak hours and for trips beyond the work-home commute, monthly passes or off-peak discount fares can be introduced. To encourage more compact development, a fare-by-distance system can be introduced in which the fare that one pays is tied directly to the distance one travels.

Municipal transit systems are required to be fiscally responsible by municipal councils and by the Province, and consequently most systems have explicit cost-recovery targets. Further, the setting of transit fares can often be a controversial political issue, and fares are usually set with a good deal of political input.

For these reasons, transit systems are often reluctant to experiment with innovative fare programs which may boost ridership, but may also upset their fare box cost-recovery targets. However, the ridership impacts of an innovative fare program can be estimated beforehand, using the experience of other municipalities with similar programs and with knowledge of local ridership characteristics. If a council regards its transit system less as a financial burden and more as a positive planning tool, and is willing to give the system some leeway in its cost-recovery targets while it experiments with different fares, innovative fare programs can have a positive impact both on ridership and revenue.

Examples of innovative transit fares include the Toronto Transit Commission's "Metro Pass" which allows unlimited ridership for a monthly fee, and similar passes issued on a day-long basis. Another example is fare integration between the City of Kingston's transit system and the transit system in Kingston Township.

Action:

- In a cooperative effort by the transit system operator, council, and municipal departments, consider implementing monthly passes, fare-by-distance, off-peak discounts, and other innovative fare programs.

PLANNING SCALE: Regional/Area Municipal URBAN SIZE: MEDIUM/ALL

Guideline: 4.6.2

FACILITATE TRANSFERS BETWEEN DIFFERENT TRANSIT MODES AND SYSTEMS

Background:

In Ontario's metropolitan areas, transit trips increasingly require transfers between different transit modes (e.g. bus to rail) and/or between transit systems operated by different municipalities. The attractiveness of transit relative to the automobile decreases if these transfers are inconvenient, unreliable and expensive in terms of multiple fares.

Fare integration and service coordination programs address this problem by ensuring that various systems and modes operate as nearly as possible as a single unit from the user's point-of-view. Fare integration involves the provision of a one-fare system which allows the passenger to travel on more than one system. In most cases, the cost of this fare is less than the combined cost of the individual fares, and there is the added convenience of having to pay only once; both of these factors encourage ridership.

Service coordination involves two transit systems or modes ensuring that their routes and service schedules are synchronized such that unnecessary transfers are eliminated and, where necessary, transfers take as little time as possible, and are in as convenient a location as possible.

Fare integration and service coordination are difficult to achieve because two or more jurisdictions, often with different priorities and objectives, are required to work closely together. However, in medium to large multi-centred urban areas, transit cannot hope to compete effectively with the automobile for trips across urban boundaries unless it provides integrated, economical, and convenient service.

Fare integration and service co-ordination should also apply to specialized transit services, where appropriate.

Action:

- Establish a Fare Integration and Service Coordination Committee, including membership from each transit system and municipality in the area, with a mandate to create a "seamless" transit service.

Transit Supportive Guidelines by Planning Scale

Appendix A

TRANSIT-SUPPORTIVE GUIDELINES BY PLANNING SCALE

GUIDELINE CHAPTER			PLANNING SCALE									
			REGIONAL		AREA MUNICIPAL		DISTRICT		NEIGHBOURHOOD		SITE	
LAND USE	2.2	Urban Structure	2.2.1	Urban Area Boundaries	2.2.1	Urban Area Boundaries						
			2.2.2	Self Contained Urban Areas								
			2.2.3	Compact Development	2.2.3	Compact Development	2.2.3	Compact Development	2.2.3	Compact Development	2.2.3	Compact Development
			2.2.4	Mixed-Uses	2.2.4	Mixed-Uses	2.2.4	Mixed-Uses	2.2.4	Mixed-Uses	2.2.4	Mixed-Uses
	2.3	Activity Nodes & Corridors	2.3.1	Mixed-Uses at Nodes	2.3.1	Mixed-Uses at Nodes	2.3.1	Mixed-Uses at Nodes	2.3.1	Mixed-Uses at Nodes		
			2.3.2	Mixed-Use Corridors	2.3.2	Mixed-Use Corridors	2.3.2	Mixed-Use Corridors	2.3.2	Mixed-Use Corridors		
			2.3.3	Network Compatibility	2.3.3	Network Compatibility						
	2.4	Specialized Uses			2.4.1	Shopping Centres & Offices	2.4.1	Shopping Centres & Offices	2.4.1	Shopping Centres & Offices		
											2.4.2	Major Trip Generators
					2.4.3	Industrial Areas	2.4.3	Industrial Areas	2.4.3	Industrial Areas	2.4.3	Industrial Areas
	2.5	Phasing of Development	2.5.1	Density and Urban Boundaries	2.5.1	Density and Urban Boundaries						
							2.5.2	Expanding Transit Service Areas	2.5.2	Expanding Transit Service Areas		
PHYSICAL DESIGN	3.2	Urban Structure	3.2.1	Transit-oriented Form	3.2.1	Transit-oriented Form	3.2.1	Transit-oriented Form	3.2.1	Transit-oriented Form	3.2.1	Transit-oriented Form
			3.2.2	Compact, Pedestrian Orientation	3.2.2	Compact, Pedestrian Orientation	3.2.2	Compact, Pedestrian Orientation	3.2.2	Compact, Pedestrian Orientation	3.2.2	Compact, Pedestrian Orientation
	3.3	Arterial & Collector Roads	3.3.1	Continuity	3.3.1	Continuity	3.3.1	Continuity	3.3.1	Continuity		
			3.3.2	Spacing	3.3.2	Spacing	3.3.2	Spacing	3.3.2	Spacing		
			3.3.3	Transit/Road Compat.	3.3.3	Transit/Road Compat.	3.3.3	Transit/Road Compat.	3.3.3	Transit/Road Compat.		
			3.3.4	Ped./Road Compat.	3.3.4	Ped./Road Compat.	3.3.4	Ped./Road Compat.	3.3.4	Ped./Road Compat.		
									3.3.5	Bus Turnarounds	3.3.5	Bus Turnarounds
	3.4	Local Roads					3.4.1	Walking Distances	3.4.1	Walking Distances	3.4.1	Walking Distances
							3.4.2	Street and Stop Spacing	3.4.2	Street and Stop Spacing	3.4.2	Street and Stop Spacing
	3.5	Streetscape Design			3.5.1	Orient Buildings to Street	3.5.1	Orient Buildings to Street	3.5.1	Orient Buildings to Street	3.5.1	Orient Buildings to Street
					3.5.2	Pedestrian Amenities	3.5.2	Pedestrian Amenities	3.5.2	Pedestrian Amenities	3.5.2	Pedestrian Amenities
											3.5.3	Waiting Areas & Shelters
	3.6	Specialized Uses	3.6.2	Transfer Nodes	3.6.2	Transfer Nodes					3.6.1	Large Shopping Centres
PROCESS/INCENTIVES	4.2	Consultation	4.2.1	Transit Input to Planning	4.2.1	Transit Input to Planning	4.2.1	Transit Input to Planning	4.2.1	Transit Input to Planning	4.2.1	Transit Input to Planning
	4.3	Planning Documents	4.3.1	Official Plans & Secondary Plan	4.3.1	Official Plans & Secondary Plan	4.3.1	Official Plans & Secondary Plan				
					4.3.2	Zoning By-Law	4.3.2	Zoning By-Law	4.3.2	Zoning By-Law	4.3.2	Zoning By-Law
							4.3.3	Plans of Subdivision	4.3.3	Plans of Subdivision	4.3.3	Plans of Subdivision
	4.4	Transit Priority	4.4.1	High-Occupancy Vehicle Lanes	4.4.1	High-Occupancy Vehicle Lanes					4.3.4	Site Plans
			4.4.2	Signal Preemption	4.4.2	Signal Preemption						
			4.4.3	Queue Jump Lanes	4.4.3	Queue Jump Lanes						
					4.4.4	Turn/Stop/Parking Restrictions	4.4.4	Turn/Stop/Parking Restrictions				
			4.4.5	Transit Malls	4.4.5	Transit Malls	4.4.5	Transit Malls				
	4.5	Parking Supply and Pricing	4.5.1	Reduced Parking Reqts	4.5.1	Reduced Parking Reqts	4.5.1	Reduced Parking Reqts	4.5.1	Reduced Parking Reqts	4.5.1	Reduced Parking Reqts
			4.5.2	Higher Tariffs	4.5.2	Higher Tariffs	4.5.2	Higher Tariffs	4.5.2	Higher Tariffs	4.5.2	Higher Tariffs
	4.6	Other Incentives	4.6.1	Transit Fares	4.6.1	Transit Fares						
			4.6.2	Transit Transfers	4.6.2	Transit Transfers						

Glossary of Terms

Appendix B

GLOSSARY OF TERMS

Activity Corridors: Areas of street-oriented uses which incorporate a mix of retail, employment and residential uses, developed at medium densities, located along arterial or collector roads serving as major transit routes. Such corridors may form the boundaries of residential subdivisions or neighbourhoods, but should act as a linear focus for activities and uses within the community.

Activity Nodes: Compact, transit-oriented, pedestrian-friendly areas where the highest concentrations of residential, employment, retail and other uses in the urban area are located. Activity nodes are generally located at points where two or more transit routes or travel modes intersect.

Area Municipality: An incorporated city, town, village or township within a regional municipality, county or district municipality.

Density, High, Medium, Low: Because these guidelines are intended for use in a variety of municipalities of different sizes, the terms "high", "medium" and "low" density are used in a conceptual sense and must be considered in the context of the prevailing development densities and building heights within a municipality. Generally, low density development refers to detached single family residential development, or the low-rise commercial or industrial development densities usually found in auto-oriented industrial parks or along highway-commercial strips; medium density development refers to low-rise multi-family residential development or low-rise commercial/residential development usually found along a pedestrian-oriented "Main Street"; and high density development refers to the more concentrated development patterns typically found in the centres of urban areas.

District: An intermediate scale of planning area, smaller than a local municipality, but comprising a number of neighbourhoods within a municipality. Detailed land use planning policies at the district level are usually addressed in secondary plans.

Floor Space Index (FSI): The ratio of the gross floor area of a building or buildings to the gross area of the lot on which the building or buildings are located. A floor space index (FSI) of 2.0 would indicate that the gross floor area of a building could be up to 2 times the gross area of the lot on which it is located.

Gross Floor Area (GFA): The total floor area of a building, including areas devoted to utilities, stairs, etc. in addition to the net floor area which is directly occupied by owners or tenants.

High Occupancy Vehicles (HOV): Public or private vehicles which carry three or more occupants.

High Occupancy Vehicle (HOV) Lanes: Special lanes designated for the exclusive or near exclusive use of High Occupancy Vehicles. HOV lanes may be located in the median or curb lanes of the street, where roadways are sufficiently wide; existing lanes can be designated as HOV lanes on a full time basis, or may be limited to peak travel periods of the day. Bicycles may also be permitted on HOV lanes in some instances.

Mixed-Use Development: Areas characterized by a wide variety of shopping, employment, entertainment, light industrial and residential uses. Mixed-use development may occur at the level of individual buildings or complexes, or at a larger scale within activity nodes or corridors.

Neighbourhood: A collection of one or more subdivisions, usually served by local park facilities, a public school, and a variety of locally-oriented commercial and retail facilities.

Pedestrian: Refers to all people on foot or moving at walking speed, including those who use mobility aids (wheelchairs, scooters etc.), persons with strollers and buggies, and frail elderly persons.

Pedestrian-Oriented Uses: Uses which rely on pedestrian traffic for the majority of their business. Such uses typically include specialized retail and food stores, restaurants, personal service establishments, convenience stores, repair shops, etc. Wherever possible, these uses should be located at street level along activity corridors and in activity nodes, and their major entrances should open directly onto the street.

Queue-Jump Lanes: Special lanes which allow transit vehicles to by-pass queues of private vehicles at intersections. Queue-jump lanes are frequently provided as modified right turn lanes, which allow buses to continue through the intersection.

Region/Regional Municipality: An upper tier municipality, comprising a number of local or area municipalities, which carries out regional-scale planning functions. Counties or district municipalities which undertake planning functions are also included in this definition.

Reverse Lotting: Lots located adjacent to an arterial or collector road which front onto an internal street, while the rear yard faces onto the arterial or collector road. Landscaping and privacy fences are usually located adjacent to the arterial or collector road, and access onto the arterial or collector is strictly limited.

Roads, Arterial: Major traffic and transit routes, intended to carry large volumes of vehicular traffic. Arterial roads should provide continuous routes across urban areas, and in urban areas, should generally be designed as "Activity Corridors" according to Guidelines 2.3.2, 3.5.1 and 3.5.2.

Roads, Collector: Traffic and transit routes designed to carry lower volumes of traffic than arterial roads, and providing continuous access across neighbourhoods. Collector roads should be bordered by higher density uses than surrounding low density residential areas, to support their role as transit routes.

Roads, Local: Roads designed to carry low traffic volumes, at low speeds, which are intended primarily to provide access to abutting uses, rather than to provide through traffic routes.

Secondary Plan: A land use policy plan for a district or large neighbourhood within a municipality which provides more detailed land use policies and designations than those found in a municipal official plan.

Signal Pre-emption Systems: A traffic signal control scheme which triggers a traffic signal to turn green in the direction that a transit vehicle is travelling, as the vehicle approaches the intersection.

Specialized Transit Services: Specialized transit services are designed specifically to serve elderly or mobility-impaired transit users. These services may be provided by transit operators, or by other government or private organizations. Detailed design and programming guidelines which may be necessary to accommodate specialized transit services have not been addressed in these guidelines.

Transfer Nodes: Major transportation interchange points which act as focal points in the transportation network, and are designed to facilitate transfers between transportation modes such as auto/commuter rail, rapid transit/local bus service, etc. As urban areas develop, a transfer node may serve as a focal point for the development of a mixed-use activity node. Transfer nodes are often associated with larger urban areas. In the Greater Toronto Area, they are usually referred to as Gateways.

Transit: Transit includes public buses, streetcars, subways, and commuter rail lines. In this document transit also encompasses public trains; ferries; buses (including intercity buses) operated by private companies and available to the public; Board of Education transportation systems; private company/institutional vans made available to employees, customers, or residents; taxis; and related pedestrian activities, as well as specialized transit services.

Transit Mall: A section of a transit route, usually located in a major activity corridor or town centre, where transit vehicles are the exclusive or dominant form of transportation in association with pedestrian travel and possibly bicycling.

Transit Node: A point where two or more transit routes intersect, usually having higher density and/or more mixed-uses than occur in areas further removed from the intersection.

Transit System, Focal: A transit system organized around two or more local transit nodes, frequently in association with a downtown core, regional shopping mall, or other major facilities. Focal transit systems often include cross-town routes which link radial routes oriented toward a central transit node.

Transit System, Grid: A transit system in which routes follow a linear grid pattern, usually associated with the network of arterial and collector roads. Transit nodes occur at regular intervals where routes intersect. Grid systems provide equal access to all parts of the urban area; they are usually associated with larger urban areas.

Transit System, Radial: A transit system organized around one central transit node, usually located in the Central Business Area. Transit routes radiate outward from this central point. Radial systems are most common in smaller urban areas.

Urban Boundary, Ultimate: The ultimate urban boundary of an urban area defines the boundary between the areas which are designated for eventual urban development and the areas intended to remain in rural uses over the long-term (ie. the next 30 years, or longer).

Urban Boundary, Interim: The interim urban boundary is located within the ultimate urban boundary, and delineates the areas which are intended for urban development over the short term (ie. the next 10 years or less).

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APPENDIX C

BIBLIOGRAPHY

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